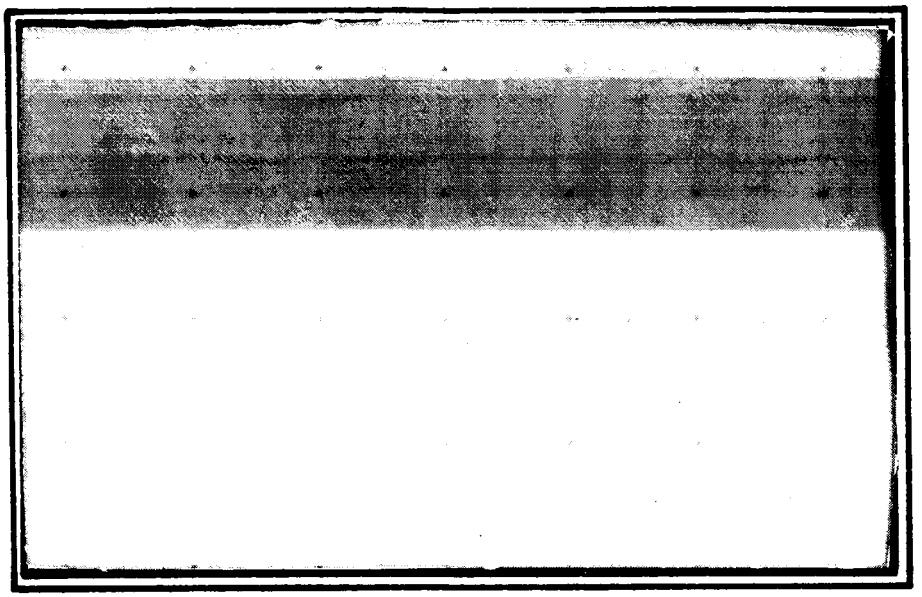

(NASA-CR-180594) A STUDY OF MICROSTRUCTURAL CHARACTERISTICS OF Ni-BASED SUPERALLOYS AT HIGH TEMPERATURES Semiannual Technical Report (Alabama Agricultural and Mechanical Coll.) 66 p Avail: NTIS HC A04/MF A01 G3/26

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Department Of Physics

Alabama Agricultural And Mechanical University

Normal, Alabama 35762

(205) 859-7308

SEMI-ANNUAL TECHNICAL REPORT

NASA GRANT NAG8-076

A STUDY OF MICROSTRUCTURAL CHARACTERISTICS OF Ni-BASED SUPERALLOYS AT HIGH TEMPERATURES

Report No: AAMU-NAG-001

SEMI-ANNUAL TECHNICAL REPORT

ON

NASA GRANT NAG8-076

A Study of Microstructural Characteristics of Ni-Based Superalloys at High Temperatures

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Submitted to

National Aeronautics and Space Administration

George C. Marshall Space Flight Center

Marshall Space Flight Center, AL 35812

May, 1987

Preface

The present report dated May, 1987 is a semi-annual report on NASA Grant NAG8-076. The project was granted on Oct 1, 1987 and this report briefly describes the initial efforts in reorienting our existing experimental facilities to work on superalloys and covers a period up to April, 1987. To initiate the work in a proper direction and plan out our mode of operation, a meeting was arranged on October 20, 1986 with Dr. E. C. McKannan, Dr. Bilyar Bhat, Mr. Richard Parr and Ms. Wendy Alter of the Materials Laboratory, MSFC.

Thanks are due to Mr. Richard Parr for providing samples of superalloy rod MAR-M246(Hf) and a used screw made out of PWA 1480.

Summary

The purpose of this investigation is to study the microstructure of the Ni-based superalloy MAR-M246 (Hf) which is used in manufacturing the components of the Space Shuttle's main engine. In the first year of investigation, we planned to study this superalloy using optical photomicrographs and the differential thermal analysis data. During this period, the existing experimental equipment like cutting, grinding/polishing machines, metallurgical microscope have been used to cut/polish and take the photomicrographs. At present we have only a 35mm camera attachment with our olympus inverted metallurgical microscope. Due to this, there has been considerable delay in processing photographs. A Perkin-Elmer Differential Thermal Analyzer (DTA-1700) had been ordered and finally installed on April 28, 1987. Preliminary test runs have been made on silver as well as MAR-M246 (Hf).

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1. INTRODUCTION

Superalloys are complex materials capable of maintaining certain of their room temperature physical and mechanical properties at elevated temperatures. Ni-based superalloy manufactured by Martin Marietta, MAR-M246(Hf) has been chosen for the present study. This is directionally solidified material with the weight percent composition: Ni (58.035%), Co (10%), W (10%), Cr (9%), Al (5.5%), Mo (2.5%), Hf (1.75%), Ti (1.5%), Ta (1.5%), C (0.15%), Zr (0.05%), and B (0.015%). The different elements go into the solid solution to provide one or more of the following effects: strength (Mo, Ta, W), oxidation resistance (Cr, Al), phase stability (Ni), gamma prime γ' (Al, Ti). The γ' phase is the key fact or responsible for the extraordinary useful high temperature properties of Ni-based superalloys and has a complex ordered structure which precipitates coherently with the matrix to provide precipitate hardening. Although it is recognized that no single property controls alloy performance, high temperature strength and in particular creep resistance and stress rupture life are of greatest importance. Hence it is worthwhile to gain fundamental understanding of the effects of the various constituents on deformation mechanisms as they regulate mechanical properties. The purpose of the present study is to use differential thermal analysis (DTA) and optical micrographs to investigate the microstructure.

DTA continues to aid in unravelling the intricacies of superalloy metallurgy. The manner in which different levels of minor additions of other elements affect an alloy's behavior is often reflected in a DTA curve. DTA curve can also be used to interpret the mechanism of property changes resulting from addition of these elements. It enables us to find the accurate temperatures at which superalloy phase changes occur. Certainly,

the effects of changes in major elements are easily determined.

2. APPROACH OF WORK AND EXPERIMENTAL PROCEDURE

After the initiation of the project on Oct. 1, 1986, a graduate student, Samuel Oyekenu was hired to work on the project. Computer search for the work relating to photomicrography, differential thermal analysis and high temperature x-ray diffraction of the Ni-based superalloys in general and MAR-M246 (Hf) in particular was carried out from the relevant files, Inspec and Metadex. It is noted that not much work is published for these studies on MAR-M246(Hf). A copy of this computer search is enclosed herewith in Appendix A.

2.1. Cutting/Grinding/Polishing Set-Up

The existing Buehler low speed high diamond concentration saw was used to cut the MAR-M246(Hf) superalloy rod. It took 4-6 hours to cut a 5/16" diameter rod but time of cutting was reduced to 3 hours when we used a new low diamond concentration wafering blade. The samples were deburred and then embedded in a 1 1/4" dia mold using Buehler EPO-KWIK resin and hardner for grinding and polishing. The sample is polished using a 240, 320, 400 and 600 grit paper on a Buehler Minimet Polisher and a final polish is given on a microcloth using a 0.3μ and 0.05μ alumina powder and water as a slurry.

2.2. Etchants

A large number of etching reagents have been recommended in the literature[1,2]. Few etchants have been tried which are listed below:

a) Kalling's Reagent #1

5g $CuCl_2$
100 ml Hcl (s.g. 1.19)
100 ml ethanol
40 ml distilled water

b)	Kalling's Reagent #2	5g $cucl_2$ 100 ml Hcl 100 ml Ethanol
c)	Adler's Reagent	3g copper-ammonium chloride 20 ml distilled water after dissolving add 50 ml Hcl (s.g. = 1.19) and 15 g Ferric chloride

2.3. Photomicrography

The existing olympus inverted metallurgical microscope model PME with 35mm camera attachment has been utilized to take photomicrographs. Various samples were cut perpendicular to and along the axis of the rod for photomicrographical observations. Polished samples were etched for 1-3 minutes using a particular etch. Photomicrographs can be recorded at a desired magnification. Few photomicrograph showing the microstructure are attached herewith in Fig. 1 to Fig. 4. Various locations show γ', MC, M_{23} C_6 phases on these pictures. Polaroid camera attachment for the PME olympus microscope is being tried to be procured from some non-NASA funds, which will facilitate us to see immediate results. Detailed investigation is underway.

2.4. Differential Thermal Analysis

Differential thermal analysis, as its name implies, involves heating 2 bodies, one of which is known to undergo no phase changes and measuring the differences as the two are heated.

If a phase change occurs in the unknown, its temperature will be higher (exothermic) or lower (endothermic) than that of the neutral body. These are normally recorded as a function of the sample temperature. Normally phase transition, dehydration, reduction, and some decomposition reactions produce endothermic reactions whereas crystallization, oxidation and some decomposition reaction produce exothermic reactions.

Fig. 1 Microstructure of Ni-based Superalloy MAR-M246(Hf)

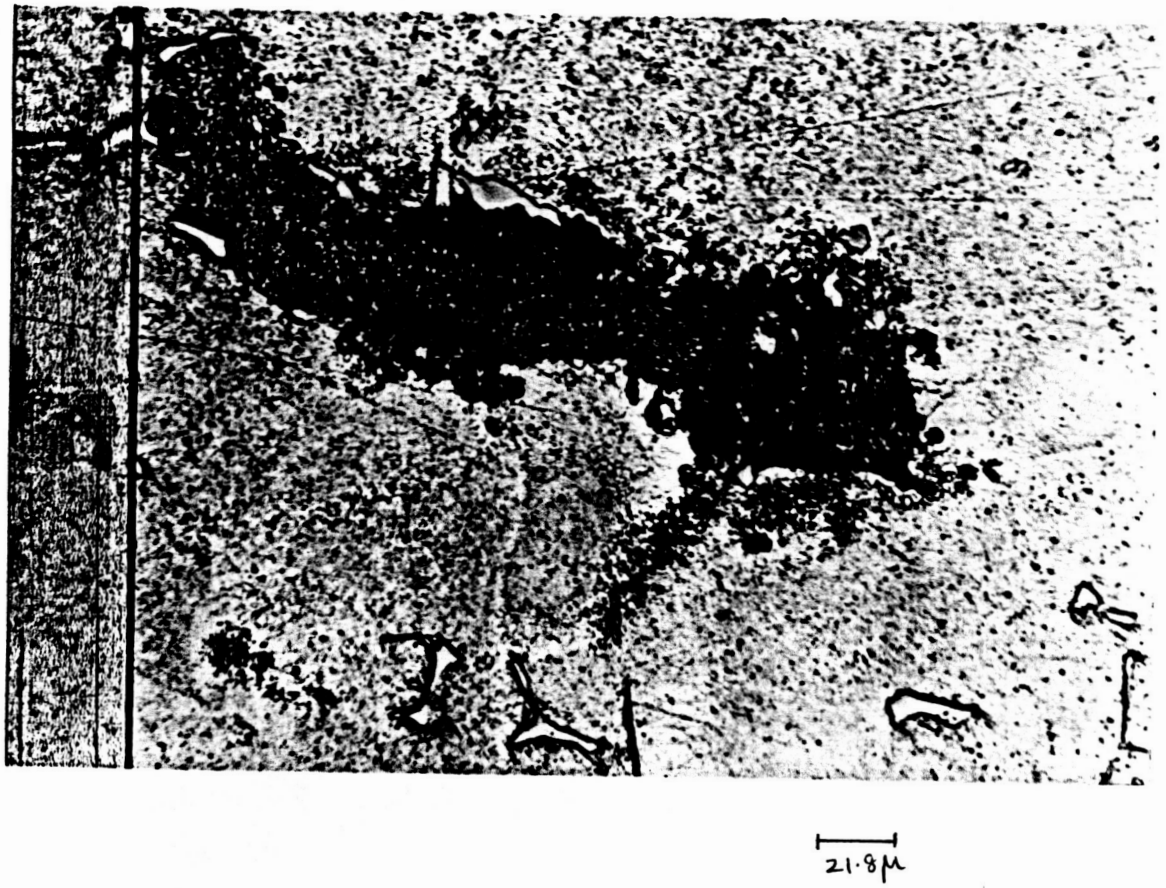

Fig. 2 Microstructure of Ni-based Superalloy MAR-M246(Hf)

Fig. 3 Photomicrograph No. 7 showing the microstructure of MAR-M246(Hf) from a rod cut along the axis.

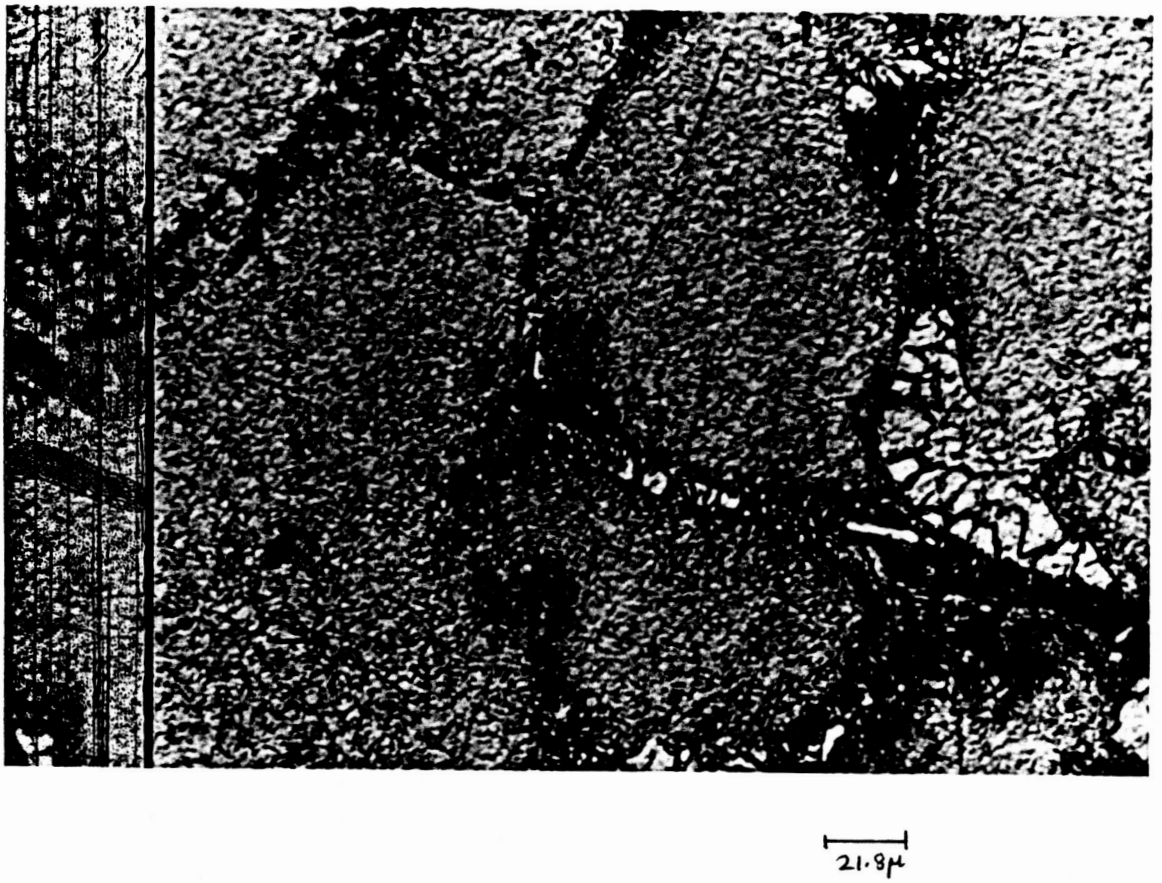

Fig. 4 Microstructure of Ni-based Superalloy MAR-M246(Hf)

As planned in the proposal, an order was placed on Oct 20, 1986 for a differential thermal analyzer (DTA 1700) from Perkin-Elmer which was installed and finally tested on April 28, 1987. DTA system has been purchased along with Thermal Analysis Data System (TADS) which could only be possible with a trade-in of a component of the existing DSC-4 system bought under a separate grant. This has increased the versatility of our equipment. A typical DTA curve for silver was taken to test the system and is shown in Fig. 5. A typical DTA curve for MAR-M246(Hf) during the heating cycle is shown in Fig. 6. Also Fig. 7 shows a similar DTA curve during the cooling cycles. Analysis of the data is in progress.

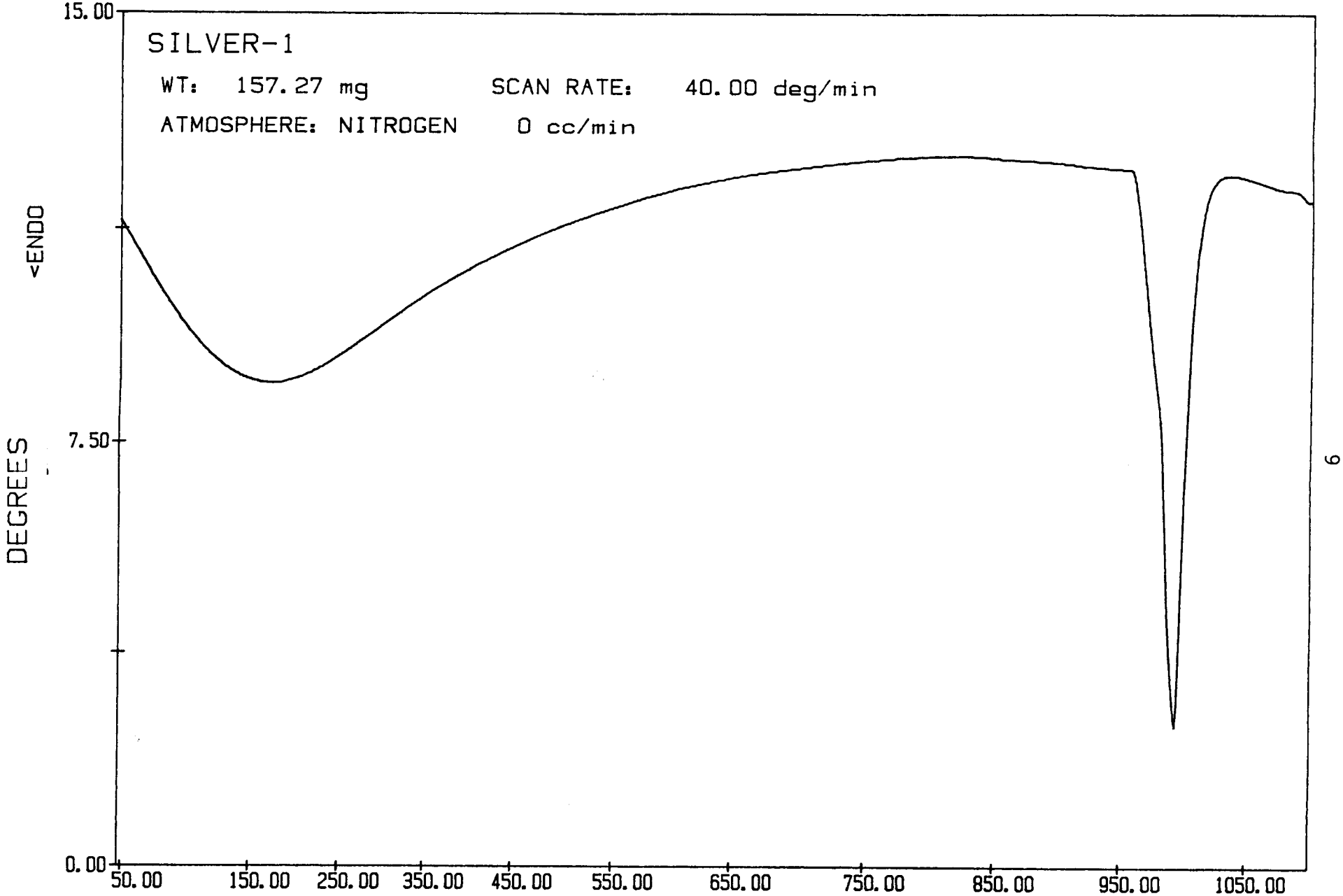

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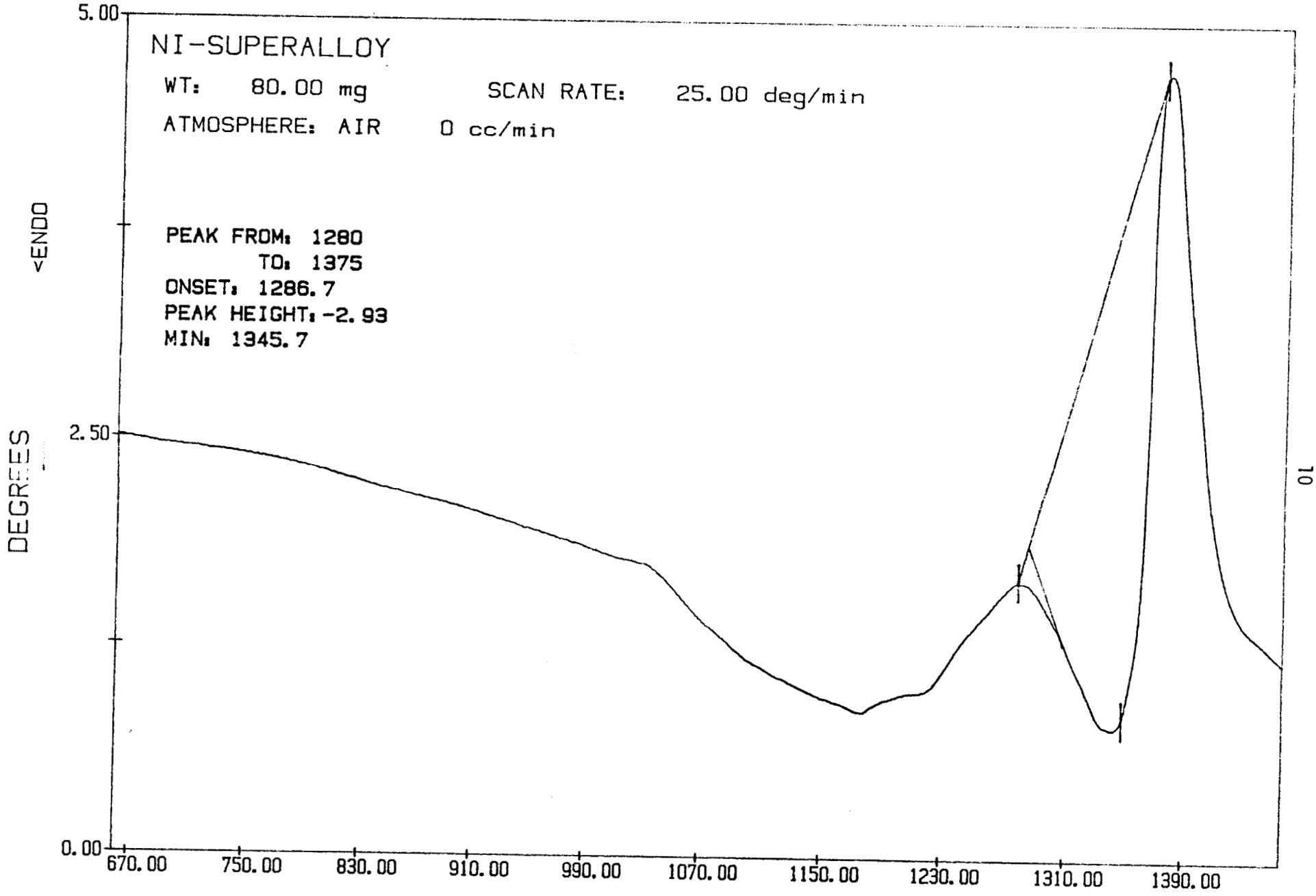
Fig. 5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SCAN RATE: 25.00 deg/min
ATMOSPHERE: AIR 0 cc/min
PEAK FROM: 1280
TO: 1375
ONSET: 1286.7
PEAK HEIGHT: -2.93
MIN: 1345.7
<ENDO
DEGREES
5.00
2.50
0.00
670.00
750.00
830.00
910.00
990.00
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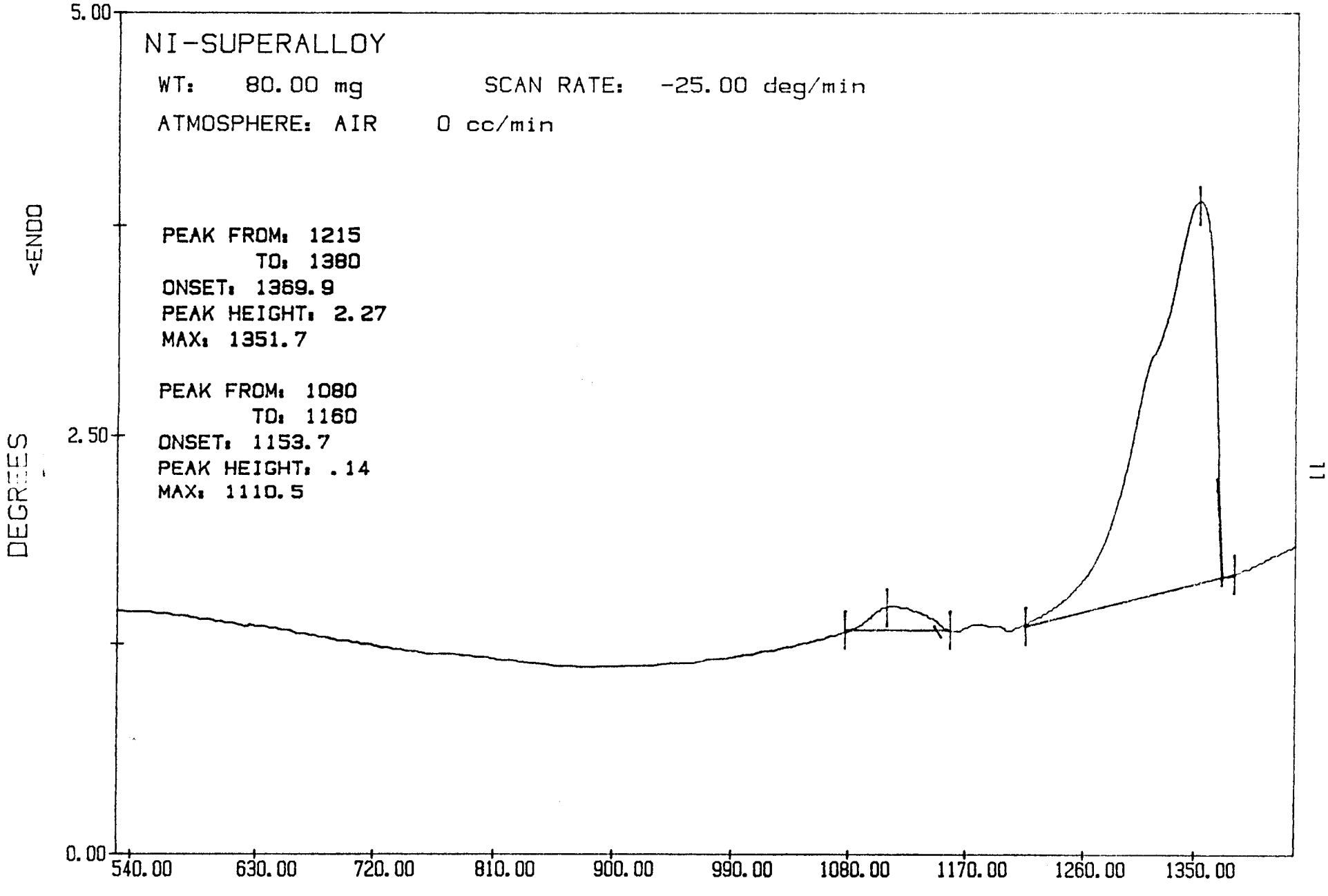
DTA

Fig. 6



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TEMPERATURE (C)

DTA

DATE: 87/04/28 TIME: 14:45

Fig. 7

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Appendix A

Computer Search

File(s) searched:

File 13:INSPEC - 77-86/ISS20 (COPR. IEE 1986) See File 12(1969 thru 1976)

Sets selected:

Set	Items	Description
1	52	NICKEL(W)BASED(W)SUPERALLOY?

Prints requested ('•' indicates user print cancellation) :

Date	Time	Description
15oct	14:09EST	P004: PR 1/3/1-26

Total items to be printed: 26

A DIALOG* SEARCH FROM THE INSPEC DATABASE

For: _____

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Topic of search: _____

Searcher: _____

Date: _____

The attached report is a result of a search of the INSPEC database using the DIALOG Information Retrieval Service.

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SAMPLE RECORD

The positions of the key fields are shown in the following sample record.

AN 1662832 A86054845
TI **Possible manifestation of quark-gluon plasma in ultra-relativistic nucleus-nucleus collisions**
AU van Hove, L.
CS Div. of Theor. Phys., CERN, Geneva, Switzerland
JN Nucl. Phys. A (Netherlands) vol.A447 443-53
PY 6 Jan. 1986
CO SN CODEN: NUPABL ISSN: 0375-9474
CT Nucleus-Nucleus Collisions II. Proceedings of the
CY Second International Conference 10-14 June 1985 Visby,
CL Sweden
U. S. Copyright Clearance Center Code: 0375-9474/86/$03.50
TC Treatment: GENERAL,REVIEW; THEORETICAL
DT Document Type: CONFERENCE PAPER
LA Languages: ENGLISH
(23 Refs)
AB The author discusses recent developments concerning possible detection of quark-gluon plasma formation. The topics covered are: early energy and entropy densities; fluctuations; transverse flow; dilepton emission by high temperature plasma; thermalization; plasma formation versus string and chain models.
DE Descriptors: colour model; duality and dual models; elementary particle inclusive interactions; nucleon-nucleon interactions; quark confinement
ID Identifiers: quark-gluon plasma; ultra-relativistic; nucleus-nucleus collisions; early energy; entropy densities; fluctuations; transverse flow; dilepton emission; high temperature plasma
CC Class Codes: A1385K; A1235E; A1240H

Key to Data Fields

AB	Abstract	DE	Descriptor
AN	INSPEC Abstract Number	DT	Document Type
AU	Author	ID	Identifier
CC	Classification Code	JN	Journal Name
CL	Conference Location	LA	Language
CO	CODEN	PY	Publication Year
CS	Corporate Source	SN	International Standard Serial Number (ISSN)
CT	Conference Title	TC	Treatment Code
CY	Conference Year	TI	Title

Data present in record depends on output format requested and type of record.

DIALOG File 13: INSPEC - 77-86/ISS20 (COPR. IEE 1986) See File 12(1969 thru 1976)

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Murata, Y.; Yukawa, N.
Dept. of Production Syst. Eng., Toyohashi Univ. of Technol., Japan
Scr. Metall. (USA) vol.20, no.5 693-6 May 1986
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U. S. Copyright Clearance Center Code: 0036-9748/86$3.00+.00

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Clark, R.K.; Unnam, J.
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Dept. of Mech. Eng., Houston Univ., University Park, TX, USA
Valluri, S.R.; Taplin, D.M.R.; Rama Rao, P.; Knott, J.F.; Dubey, R. (Editors)
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4-10 Dec. 1984 New Delhi, India
Publ: Pergamon, Oxford, England
6 vol. 1+4033 pp. ISBN 0 08 029309 3

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NASA Lewis Res. Center, Cleveland, OH, USA
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DELARGY, K.M.; SMITH, G.D.W.
DEPT. OF METALL. AND SCI. OF MATERIALS, UNIV. OF OXFORD, OXFORD, ENGLAND
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INT. J. FATIGUE (GB) VOL.5, NO.2 95-7 APRIL 1983
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DEPT. OF METALL. AND MATERIALS SCI., UNIV. OF CAMBRIDGE, CAMBRIDGE, ENGLAND
J. NUCL. MATER. (NETHERLANDS) VOL.115, NO.1 1-10 MARCH 1983
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File(s) searched:

File 32:Metadex - 66-86/Oct (Copr. Am. Soc. Metals)

Sets selected:

Set	Items	Description
1	62	NICKEL(W)BASED(W)SUPERALLOY?

Prints requested ('•' indicates user print cancellation) :

Date	Time	Description
15oct	14:13EST	P005: PR 1/3/1-25
15oct	14:13EST	P006: PR 1/3/26-50
15oct	14:13EST	P007: PR 1/3/51-62

Total items to be printed: 62

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The METADEX database, produced by the American Society for Metals (ASM) and the Metals Society (London), provides comprehensive coverage of international literature on the science and practice of metallurgy. The database corresponds to the following printed publications: Review of Metal Literature (1966-1967), Metals Abstracts (1968 to the present), Alloys Index (1974 to the present), and Steels Supplement (1983-1984). The Metals Abstracts portion of the file includes references to about 1,200 primary journal sources. Alloys Index provides access to the records through commercial, numerical, and compositional alloy designations; specific metallic systems; and intermetallic compounds found within these systems. Abstracts are included for most records since 1979. In addition to specialized topics (including specific alloy designations, intermetallic compounds, and metallurgical systems), six basic categories of metallurgy are covered: materials, processes, properties, products, forms, and influencing factors.

*DIALOG Information Services, Inc. Trademark
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SAMPLE RECORD

The positions of the key fields are shown in the following sample record.

```
AN      923344  85-560326
TI       Heat Treatment of Single Crystals.
AU        Field, T T ; Chem, O Y ; Geary, A R ; Salkeld, R W;
        Ulion, N E
CS        United Technologies Corp
PN AD     Patent: GB2141137A, UK  18 Apr. 1984
PY        12 Dec. 1984
JA        Journal Announcement: 8503
DT        Document Type: PATENT
AB        Single crystal superalloys with improved mechanical
        and creep properties are produced by heat treatment at
        temperatures just above the incipient melting
        temperature, followed by a holding time at that
        temperature, to permit diffusion and healing of the
        melt damage, prior to quenching. The process may be
        used to reclaim overheated single crystal superalloy
        articles. Details of a particular cycle applied to a
        specific superalloy composition (Ni--10% Cr--5%
        Al--1.5% Ti--4% W-12% Ta--5% Co) are disclosed.
CN DE     Descriptors: Superalloys, Heat treatment; Nickel
        base alloys, Heat treatment; Homogenizing; Diffusion
        annealing; Cooling rate
ES        Alloy Index(Identifier):Ni-10Cr-5Al-1.5Ti-4W-12Ta-5-
CC ID   Co, SP, NI
SH          Section Heading: 56  (THERMAL TREATMENT)
                (Copyright by the American Society for Metals and
                    the Metals Society, 1985.)
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Key to Data Fields

AB	Abstract	ID	Identifier
AD	Application Date	JA	Journal Announcement
AN	ASM Abstract Number	JN	Journal Name
AU	Author	LA	Language
CC	Alloy Class Code	PI	Periodic Index Term
CL	Conference Location	PN	Patent Number
CN	Alloy Class Name	PU	Publisher
CS	Corporate Source	PY	Publication Year
CT	Conference Title	RN	Report Number
CY	Conference Year	SH	Section Heading
DE	Descriptor	SH	Section Heading Code
DT	Document Type	SN	Intl. Standard Book or Serial No.(ISBN or ISSN)
ES	Element Symbol		
GN	Group Number	TI	Title

Data present in record depends on output format requested and type of record.

DIALOG File 32: Metadex - 66-86/Oct (Copr. Am. Soc. Metals)

988144 86-313679
Deformation of a Nickel-Based Superalloy: Compression Creep and In Situ Experiments.
Ignat, M ; Louchet, F ; Pelissier, J
Strength of Metals and Alloys. Vol. 1, Montreal, Canada, 12-16 Aug. 1985
689-694
Publ: Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 OBW, UK, 1985
Journal Announcement: 8610

987259 86-130614
TEM Analysis of Square-Shaped Dislocation Configurations in the gamma ' Phase of a Nickel--Based Superalloy.
Louchet, F ; Ignat, M
Acta Metall., 34, (8), 1681-1685 Aug. 1986
ISSN: 0001-6160
Journal Announcement: 8610

987005 86-111058
Solid-State Reaction for ZrC Formation in a Zirconium-Doped Nickel-Based Superalloy.
Murata, Y ; Yukawa, N
Scr. Metall., 20, (5), 693-696 May 1986 ISSN: 0036-9748
Journal Announcement: 8610

982680 86-540775
Some Microstructural Aspects of HIP'd Cast Nickel Based Superalloys.
Holmes, D
2nd International Conference on Isostatic Pressing. Vol. 1, Stratford-upon-Avon, UK, 21-23 Sept. 1982
16.1-16.28
Publ: MPR (Metal Powder Report) Publishing Services, 18-19 Talbot Chambers, Market Street, Shrewsbury SY1 1LG, UK, 1982
Journal Announcement: 8608

981076 86-313057
Study of the Damage During Creep at 650 deg C of Nickel Based Superalloys Produced by Powder Metallurgy.
Escamez, J M ; Strudel, J L
Autumn Meeting (Journees Metallurgiques d'Automne) of the Societe Francaise de Metallurgie 1985. (Abstracts Only), Paris, France, 22-24 Oct. 1985
Mem. Etud. Sci. Rev. Metall., 82, (9), 440 Sept. 1985
ISSN: 0245-8292
Journal Announcement: 8608

979976 86-121043
Microstructure and Mechanical Properties of Nickel Based Superalloys Obtained by Rapid Cooling and Hot Compacting.
Barbassat, M -H ; Duflos, F ; Lasalmonie, A
Autumn Meeting (Journees Metallurgiques d'Automne) of the Societe Francaise de Metallurgie 1985. (Abstracts Only), Paris, France, 22-24 Oct. 1985
Mem. Etud. Sci. Rev. Metall., 82, (9), 471 Sept. 1985
ISSN: 0245-8292
Journal Announcement: 8608

973118 86-710144
Superalloys--Rolls-Royce's Bread and Butter Metals.
Met. Bull. Mon., (177), 9, 11, 13, 17 Sept. 1985
ISSN: 0373-4064
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Magnesium Distribution in a Nickel-Based Superalloy.
Ma, P ; Zhu, J
Metallography, 19, (1), 115-118 Feb. 1986
ISSN: 0026-0800
Journal Announcement: 8605

965413 86-510387
Production and Characterization of Nickel-Based Superalloy Single Crystals.
Bull. Jpn. Inst. Met., 24, (6), 462-470 1985
ISSN: 0021-4426
Journal Announcement: 8603

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Compression Studies of a Nickel-Based Superalloy, MAR-M200, and of Ni sub 3 Al.
Mauer, F A ; Munro, R G ; Piermarini, G J ; Block, S ; Dandekar, D P
J. Appl. Phys., 58, (10), 3727-3730 15 Nov. 1985
ISSN: 0021-8979
Journal Announcement: 8602

957127 85-710382
Which Carbide?
Brookes, K
Metalwork. Prod., 129, (7), 69-87 July 1985
ISSN: 0026-1033
Journal Announcement: 8512

947019 85-313960
Non-Metallic Inclusions in Nickel Based Superalloy NIMONIC Alloy AP-1 Produced by the Powder Route: a Review of Their Effect on Properties, and the Production Methods Used to Minimise the Amount Present.
Bridges, P J ; Eggar, J W
(cont. next page)

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PM Aerospace Materials, Vol. I, Berne, Switzerland, 12-14 Nov. 1984
Pp 24
Publ: MPR Publishing Services Ltd., Old Bank Buildings, Bellstone, Shrewsbury SY1 1HU, UK, 1984
Report No.: Paper No. 22
Journal Announcement: 8510

947011 85-313952
Modes of Failure Under Creep/Fatigue Loading of a Nickel-Based Superalloy.
Winstone, M R ; Nikbin, K M ; Webster, G A
J. Mater. Sci., 20, (7), 2471-2476 July 1985
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Laser-Microprobe Mass-Analysis of Surface Layers and Bulk Solids.
Southon, M J ; Witt, M C ; Harris, A ; Wallach, E R ; Myatt, J
Vacuum, 34, (10-11), 903-909 Oct.-Nov. 1984
ISSN: 0042-207X
Journal Announcement: 8508

937052 85-430150
Optimizing Deoxidation and Desulphurization During Vacuum Induction Melting of Alloy 718.
Alexander, J
Mater. Sci. Technol., 1, (2), 167-170 Feb. 1985
ISSN: 0267-0836
Journal Announcement: 8507

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Platinum and the Oxidation Behavior of a Nickel Based Superalloy.
Tatlock, G J ; Hurd, T J
Oxid. Met., 22, (5-6), 201-226 Dec. 1984 ISSN: 0030-770X
Journal Announcement: 8506

932511 85-312269
Deformation Studies in a Single Crystal Superalloy.
Hopgood, A A ; Martin, J W
Electron Microscopy 1984. Vol. 1, Budapest, Hungary, 13-18 Aug. 1984
485-486
Publ: Programme Committee of the Eighth European Congress on Electron Microscopy, Congress Bureau MOTESZ, Budapest, P.O. Box 32, H-1361, Hungary, 1984
Journal Announcement: 8506

924236 85-120505
Surface Recrystallization in a Single-Crystal Nickel-Based Superalloy.
Bond, S D ; Martin, J W
J. Mater. Sci., 19, (12), 3867-3872 Dec. 1984
ISSN: 0022-2461
Journal Announcement: 8504

921036 85-140073
Serrated Grain Boundary Formation Potential of Nickel-Based Superalloys and Its Implications.
Koul, A K ; Thamburaj, R
Metall. Trans. A, 16A, (1), 17-26 Jan. 1985
ISSN: 0360-2133
Journal Announcement: 8503

919421 85-350360
The Influence of Nickel Content on the Corrosion Behaviour of Fe--25Cr--2.5Al--1.5Zr Alloys in Oxygen/Sulphur Dioxide Atmospheres.
Strafford, K N ; Mistry, P
Coatings and Surface Treatment for Corrosion and Wear Resistance, 237-248
Publ: Ellis Horwood, Market Cross House, Cooper Street, Chichester, West Sussex PO19 1EB, England, 1984
Journal Announcement: 8502

915118 85-310174
Creep Life Predictions in Nickel-Based Superalloys.
Koul, A K ; Castillo, R ; Willett, K
Mater. Sci. Eng., 66, (2), 213-226 15 Sept. 1984
ISSN: 0025-5416
Journal Announcement: 8501

911320 84-210353
A Study of Gamma Prime Particles in a Nickel-Based Superalloy Using the Techniques of Transmission Electron Microscopy and Small-Angle Neutron Scattering.
Windsor, C G ; Rainey, V S ; Rose, P K ; Callen, V M
J. Phys. F, Met. Phys., 14, (8), 1771-1787 Aug. 1984
ISSN: 0305-4608
Journal Announcement: 8412

901558 84-313073
Study of the Crack Tip Plastic Strain in a Nickel-Based Superalloy.
Crompton, J S ; Martin, J W
Metallography, 17, (2), 139-148 May 1984 ISSN: 0026-0800
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DIALOG File 32: Metadex - 66-86/Oct (Copr. Am. Soc. Metals)

884177 84-320268
Effects of Atmosphere and Dew Point on the Wetting Characteristics of a Glass-Ceramic on Two Nickel-Based Superalloys.
Kramer, D P ; Osborne, N R
Ceram. Eng. Sci. Proc., 4, (9-10), 740-750 Sept.-Oct. 1983
ISSN: 0196-6219
Journal Announcement: 8404

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Composite Ceramic Metal Components.
Conolly, R I
Rolls Royce Ltd
Patent: GB2117799A ,UK 4 Mar. 1983
19 Oct. 1983
Journal Announcement: 8403

DIALOG File 32: Metadex - 66-86/Oct (Copr. Am. Soc. Metals)

882026 84-550548
Production of Refractory, Corrosion Resistant Composite Materials of Molybdenum, a Nickel Based Superalloy and an Iron Based Alloy for Heating Elements by Explosive Cladding.
Prummer, R ; Henne, R
Trends in Refractory Materials, Hard Metals and Special Materials and their Technology, 10th Plansee Seminar, Reutte, Austria, 1-5 June 1981
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Publ: Metallwerk Plansee, A-6600 Reutte, Austria, 1981
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881519 84-510405
Melt Spinning Nickel-Based Superalloys.
Piggs, S J ; Charles, J A
Met. Technol., 10, (11), 435-438 Nov. 1983
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Journal Announcement: 8403

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Effects of Atmosphere and Dew Point on the Wetting Characteristics of a Glass--Ceramic on Two Nickel-Based Superalloys (Hastelloy C-276).
Kramer, D P ; Osborne, N R
Monsanto Research Corp
Pp 25 1983
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Journal Announcement: 8402

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The Effects of Low-Pressure Plasma Spray Processing Conditions on the Properties of a Nickel-Based Superalloy.
Rairden, J R ; Jackson, M R ; Henry, M F
10th International Thermal Spraying Conference (Projection a Chaud) (Thermisches Spritzen), Essen, West Germany, 2-6 May 1983
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863747 83-352219
The Effect of Hot Corrosion on Creep and Fracture Behaviour of Cast Nickel--Based Superalloy IN 738 LC.
Guo, J -T ; Ranucci, D ; Picco, E ; Strocchi, P M
High Temperature Alloys for Gas Turbines 1982, Liege, Belgium, 4-6 Oct. 1982
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Publ: D. Reidel Publishing Co., P.O. Box 17, 3300 AA Dordrecht, The Netherlands, 1982
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On the Mechanism of Serrated Grain Boundary Formation in Nickel-Based Superalloys.
Koul, A K ; Gessinger, G H
Acta Metall., 31, (7), 1061-1069 July 1983
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Journal Announcement: 8310

862084 83-110941
Phase Composition and Phase Stability of a High-Chromium Nickel-Based Superalloy, IN939.
Delargy, K M ; Smith, G D W
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860732 83-460160
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Coupland, D R ; Hall, C W ; McGill, I R
Platinum Met. Rev., 26, (4), 146-157 Oct. 1982
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A Microstructural Model of High-Temperature Strength and Rupture Life Time for Second Phase Particle Hardened Alloys.
Reppich, B
Z. Metallkd., 73, (11), 697-705 Nov. 1982
ISSN: 0044-3093
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831768 83-310074
Micromechanisms of Creep Crack Growth in Nickel-Based Superalloys.
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Micro and Macro Mechanics of Crack Growth, Louisville, Ky., 13-15 Oct. 1981
131-136
Publ: Metallurgical Society/AIME, P.O. Box 430, 420 Commonwealth Dr., Warrendale, Pa. 15086, 1982
Journal Announcement: 8301

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Enthalpy Measurement for Two Nickel-Based Superalloys.
Lamanthe, G ; Riquet, J P ; Bernard, C
Rev. Int. Hautes Temp. Refract., 18, (4), 265-277 1981
ISSN: 0035-3434
Journal Announcement: 8212

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828491 82-314639
Influence of Coatings and Hot Corrosion on the Fatigue Behaviour of Nickel-Based Superalloys.
Schneider, K ; vonArnim, H ; Grunling, H W
Thin Solid Films, 84, (1), 29-36 2 Oct. 1981
ISSN: 0040-6090
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828440 82-314588
Creep Properties of Nickel-Based Superalloy Single Crystals. I.--High Temperature Creep (980 deg C).
Carry, C ; Houis, C ; Strudel, J L
Mem. Etud. Sci. Rev. Metall., 78, (3), 139-146 Mar. 1981
ISSN: 0245-8292
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815136 82-312597
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Brown, C W ; Hicks, M A
Int. J. Fatigue, 4, (2), 73-81 Apr. 1982
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Prior Particle Boundaries in Hot Isostatically Pressed Nickel Based Superalloy, Studied by Auger Electron Spectroscopy.
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Precipitation in an As-Atomized Nickel-Based Superalloy Powder.
Ritter, A M ; Henry, M F
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Journal Announcement: 8205

797157 82-560127
The Laser Glazing of a Cast Nickel-Based Superalloy and an Alpha + Beta Titanium Alloy.
Lipscombe, K ; Steen, W M ; West, D R F
Rapid Solidification Processing, Principles and Technologies.--II, Reston, Va., 23-26 Mar. 1980
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Creep Properties of Single-Crystal Nickel-Based Superalloys. II.--Creep at Medium Temperatures (760 deg C).
Carry, C ; Houis, C ; Strudel, J L
Mem. Etud. Sci. Rev. Metall., 78, (7/8), 337-343 July-Aug. 1981 ISSN: 0245-8292
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794597 82-120224
The Structures of Rapidly Quenched Nickel-Based Superalloy Ribbons Produced by Melt Spinning.
Davies, H A ; Shohoji, N ; Warrington, D H
Rapid Solidification Processing, Principles and Technologies.--II, Reston, Va., 23-26 Mar. 1980
153-164
Publ: Claitor's Publishing Division, 3165 S. Acadian Thruway, P.O. Box 3333, Baton Rouge, La. 70821, 1980
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The Conrol of Slip Distribution by Duplex Dispersions of gamma ' Phase in a Nickel--Based Superalloy.
McGurran, B ; Martin, J W
Z. Metallkd., 72, (8), 538-542 Aug. 1981 ISSN: 0044-3093
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788222 81-131061
Effects of Low-Temperature Aging on Some Nickel-Based Superalloys.
Johnson, P D
University of Notre Dame
Diss. Abstr. Int., 41, (6), Pp 156 Dec. 1980
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Itzhak, D ; Tuler, F R ; Schieber, M
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Journal Announcement: 8108

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Structure Development During Hot Pressing of a Nickel Based Superalloy APK 1.
Mitkov, M
Sintering Processes. Materials Science Research Vol. 13 [Proc. Conf.], Notre Dame, Ind., U.S.A., June 1979, 505-515 1980 ISSN: 030640336
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759810 81-720083
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Kuczynski, G C
Notre Dame, Ind., 18-20 June 1980
Pp 575, 61/2 x 101/4 in., Illustrated, dollars U.S. 55.00
Publ: Plenum Press, 227 W. 17th St., New York, N.Y. 10011, 1980
Journal Announcement: 8103

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Structure Development During Hot Pressing of a Nickel-Based Superalloy APK 1.
Mitkov, M
Sintering Processes, Fifth International Conference on Sintering and Related Phenomena, Notre Dame, Ind., 18-20 June 1979
505-515
Publ: Plenum Press, 227 W. 17th St., New York, N.Y. 10011, 1980
Journal Announcement: 8103

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756374 81-720074
Sintering Processes. Materials Science Research Vol. 13.
Fifth International Conference on Sintering and Related Phenomena, Notre Dame, Indiana, U.S.A., 18-21 June, 1979
Pp xi + 575, 17 x 26 cm, illustrated (USdollars U.S. 55.00)
Publ: Plenum Press, New York, U.S.A., 1980
Journal Announcement: 8102

756356 81-720056
Superalloys 1980.
Tien, J K ; Wlodek, S T ; Morrow, H ; III; Gell, M ; Mauer, G E
Champion, Pa., 21-25 Sept. 1980
Publ: American Society for Metals, Metals Park, Ohio 44073, 1980
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755587 81-540059
The Influence of Powder Particle Surface Composition on the Properties of a Nickel-Based Superalloy Produced by Hot Isostatic Pressing.
Aubin, C ; Davidson, J H ; Trottier, J P
Superalloys 1980, Champion, Pa., 21-25 Sept. 1980
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Publ: American Society for Metals, Metals Park, Ohio 44073, 1980
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753835 81-210057
The Study of Local Plastic Strain in Nickel-Based Superalloys by Selected Area Channeling Patterns in the STEM.
Crompton, J S ; Martin, J W
Metallography, 13, (3), 225-234 Sept. 1980
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First published in Philos. Trans. R. Soc. London A, 1980, 295, (413). Pp 341, A4, illustrated
Publ: The Royal Society, 6 Carlton House Terrace, London SW1Y 5AG, 1980
Journal Announcement: 8009

724618 80-610414
New Materials for High-Temperature Applications.
Jones, D R H
University of Cambridge Department of Engineering, Research in the Materials Group, 8 1979
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Pp 909, 6 x 91/4 in., Illustrated dollars U.S. 65.00
Publ: American Society for Testing and Materials, 1916 Race St., Philadelphia, Pa. 19103, 1979
Report No.: STP No. 675
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706255 80-580110
Hot-Corrosion-Resistant Duplex Coatings for a Superalloy.
Rairden, J R
Thin Solid Films, 53, (2), 251-258 1 Sept. 1978
ISSN: 0040-6090
Journal Announcement: 8002

705107 80-340142
Interaction Between Silicon Carbide and a Nickel-Based Superalloy at Elevated Temperatures.
Mehan, R L ; Bolon, R B
J. Mater. Sci., 14, (10), 2471-2481 Oct. 1979
Journal Announcement: 8002

704307 80-310556
Micromechanisms of Low-Cycle Fatigue in Nickel-Based Superalloys at Elevated Temperatures.
Runkle, J C ; Pelloux, R M
Fatigue Mechanisms, Kansas City, Mo., 22-24 May 1978
501-527
Publ: American Society for Testing and Materials, 1916 Race St., Philadelphia, Pa. 19103, 1979
Journal Announcement: 8002

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MECHANISMS OF DAMAGE AND FRACTURE IN HIGH-TEMPERATURE, LOW-CYCLE FATIGUE OF A CAST NICKEL-BASED SUPERALLOY
MCMAHON, C J ; COFFIN JR, L F
MET TRANS DEC. 1970, 1, --12--, 3443-3450.,
Journal Announcement: 7107

201404 70-120129
MICROSTRUCTURE OF NICKEL-BASED SUPERALLOYS
SABOL, G P ; STICKLER, R
PHYSICA STATUS SOLIDI 1 SEPT. 1969, 35, --1--, 11-52,
Journal Announcement: 7002

File(s) searched:

File 13:INSPEC - 77-86/ISS20 (COPR. IEE 1986) See File 12(1969 thru 1976)

Sets selected:

Set	Items	Description
1	52	NICKEL(W)BASED(W)SUPERALLOY?

Prints requested ('*' indicates user print cancellation) :

Date	Time	Description
15oct	14:15EST	P008: PR S1/3/27-52

Total items to be printed: 26

A DIALOG* SEARCH FROM THE INSPEC DATABASE

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Searcher: _____

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The attached report is a result of a search of the INSPEC database using the DIALOG Information Retrieval Service.

INSPEC (Information Services for Physics, Electronics, and Computing) corresponds to the four Science Abstracts printed publications: Physics Abstracts, Electrical and Electronics Abstracts, Computer and Control Abstracts, and IT Focus: Update on Information Technology. The Science Abstracts family of abstract journals began publication in 1898, and now forms the largest English-language database in the fields of physics, electrical engineering, electronics, computers, control engineering, and information technology. Approximately 15 percent of the database's source publications are in non-English languages; all articles are abstracted and indexed in English.

SAMPLE RECORD

The positions of the key fields are shown in the following sample record.

AN 1662832 A86054845
TI **Possible manifestation of quark-gluon plasma in ultra-relativistic nucleus-nucleus collisions**
AU van Hove, L.
CS Div. of Theor. Phys., CERN, Geneva, Switzerland
JN Nucl. Phys. A (Netherlands) vol.A447 443-53
PY 6 Jan. 1986
CO SN CODEN: NUPABL ISSN: 0375-9474
CT Nucleus-Nucleus Collisions II. Proceedings of the
CY Second International Conference 10-14 June 1985 Visby,
CL Sweden
U. S. Copyright Clearance Center Code: 0375-9474/86/$03.50
TC Treatment: GENERAL,REVIEW; THEORETICAL
DT Document Type: CONFERENCE PAPER
LA Languages: ENGLISH
(23 Refs)
AB The author discusses recent developments concerning possible detection of quark-gluon plasma formation. The topics covered are: early energy and entropy densities; fluctuations; transverse flow; dilepton emission by high temperature plasma; thermalization; plasma formation versus string and chain models.
DE Descriptors: colour model; duality and dual models; elementary particle inclusive interactions; nucleon-nucleon interactions; quark confinement
ID Identifiers: quark-gluon plasma; ultra-relativistic; nucleus-nucleus collisions; early energy; entropy densities; fluctuations; transverse flow; dilepton emission; high temperature plasma
CC Class Codes: A1385K; A1235E; A1240H
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Key to Data Fields

AB	Abstract	DE	Descriptor
AN	INSPEC Abstract Number	DT	Document Type
AU	Author	ID	Identifier
CC	Classification Code	JN	Journal Name
CL	Conference Location	LA	Language
CO	CODEN	PY	Publication Year
CS	Corporate Source	SN	International Standard Serial Number (ISSN)
CT	Conference Title	TC	Treatment Code
CY	Conference Year	TI	Title

Data present in record depends on output format requested and type of record.

*DIALOG Information Services, Inc. Trademark
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DIALOG File 13: INSPEC - 77-86/ISS20 (COPR. IEE 1986) See File 12(1969 thru 1976)

1004500 A83024361
A MICROSTRUCTURAL MODEL OF HIGH-TEMPERATURE STRENGTH AND RUPTURE LIFE TIME FOR SECOND PHASE PARTICLE HARDENED ALLOYS
REPPICH, B.
INST. FUR WERKSTOFFWISSENSCHAFTEN I, UNIV. ERLANGEN-NURNBERG, ERLANGEN, GERMANY
Z. METALLKD. (GERMANY) VOL.73, NO.11 697-705 NOV. 1982
CODEN: ZEMTAE ISSN: 0044-3093

983829 A83009053
ENTHALPY OF SOLIDIFICATION MEASUREMENT FOR NICKEL-BASED SUPERALLOYS
LAMANTHE, G.; RIQUET, J.P.; BERNARD, C.
INST. NAT. POLYTECH. DE GRENOBLE, ENSEEG, SAINT MARTIN D'HERES, FRANCE
REV. INT. HAUTES TEMP. AND REFRACT. (FRANCE) VOL.18, NO.4 265-77 1981
CODEN: RIHTAV ISSN: 0035-3434

983794 A83009017
NECKLACE STRUCTURE OBTAINED BY FORGING ASTROLOY SUPERSOLIDUS-SINTERED PREFORMS
JEANDIN, M.
CENTRE DES MATERIAUX, ECOLE NAT. SUPERIEURE DES MINES DE PARIS, EVRY, FRANCE
J. MATER. SCI. (GB) VOL.17, NO.10 2902-10 OCT. 1982
CODEN: JMTSAS ISSN: 0022-2461

953785 A82109838
THE EFFECT OF PARTICLE MISFIT ON VOID FORMATION UNDER ELECTRON AND NEUTRON IRRADIATION IN GAMMA-PRIME STRENGTHENED SUPERALLOYS
GELLES, D.S.; THOMAS, L.E.; SPONSELLER, D.L.
HANFORD ENGNG. DEV. LAB. , RICHLAND, WA, USA
J. NUCL. MATER. (NETHERLANDS) VOL.108-109 527-36 JULY-AUG. 1982
CODEN: JNUMAM
PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON NEUTRON IRRADIATION EFFECTS IN SOLIDS 9-12 NOV. 1981 ARGONNE, IL, USA

949730 A82105153
LONG-TERM GROWTH OF SUPERALLOY GAMMA MINUTES PARTICLES
FOOTNER, P.K.; RICHARDS, B.P.
GEC HIRST RES. CENTRE, WEMBLEY, ENGLAND
J. MATER. SCI. (GB) VOL.17, NO.7 2141-53 JULY 1982
CODEN: JMTSAS

948460 A82103820
SWELLING IN COMMERCIAL FE-CR-NI BASED ALLOYS UNDER ELECTRON IRRADIATION
THOMAS, L.E.; GELLES, D.S.
HANFORD ENGNG. DEV. LAB., RICHLAND, WA, USA
J. NUCL. MATER. (NETHERLANDS) VOL.108-109 490-503 JULY-AUG. 1982
CODEN: JNUMAM
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930320 A82093599
FATIGUE GROWTH OF SURFACE CRACKS IN NICKEL-BASED SUPERALLOYS
BROWN, C.W.; HICKS, M.A.
ROLLS ROYCE LTD., DERBY, ENGLAND
INT. J. FATIGUE (GB) VOL.4, NO.2 73-81 APRIL 1982
CODEN: IJFADB

885715 A82067519
THE EFFECT OF DEFECTS ON THE FATIGUE CRACK INITIATION PROCESS IN TWO P/M SUPERALLOYS. II. SURFACE-SUBSURFACE TRANSITION
HYZAK, J.M.; BERNSTEIN, I.M.
METALS AND CERAMICS DIV., AIR FORCE MATERIALS LAB., WRIGHT-PATTERSON AFB, OH, USA
METALL. TRANS. A (USA) VOL.13A, NO.1 45-52 JAN. 1982
CODEN: MTTABN

853680 A82047032
PRECIPITATION IN AN AS-ATOMIZED NICKEL-BASED SUPERALLOY POWDER
RITTER, A.M.; HENRY, M.F.
CORP. RES. AND DEV., GENERAL ELECTRIC CO., SCHENECTADY, NY, USA
J. MATER. SCI. (GB) VOL.17, NO.1 73-80 JAN. 1982
CODEN: JMTSAS

849216 A82041610
PRECIPITATION OF HFC IN MM-002
SPILLING, P.D.; MARTIN, J.W.
DEPT. OF METALL. AND SCI. OF MATERIALS, OXFORD UNIV., OXFORD, ENGLAND
METALLOGRAPHY (USA) VOL.15, NO.1 63-71 FEB. 1982
CODEN: MEIJAP

834023 A82031850
INFLUENCE OF COATINGS AND HOT CORROSION ON THE FATIGUE BEHAVIOUR OF NICKEL-BASED SUPERALLOYS
SCHNEIDER, K.; VON ARNIM, H.; GRUNLING, H.W.
BROWN, BOVERI AND CIE, MANNHEIM, GERMANY
THIN SOLID FILMS (SWITZERLAND) VOL.84, NO.1 29-36 2 OCT. 1981
CODEN: THSFAP
INTERNATIONAL CONFERENCE ON METALLURGICAL COATINGS 6-10 APRIL 1981 SAN FRANCISCO, CA, USA

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817787 A82022279
CREEP PROPERTIES OF SINGLE-CRYSTAL NICKEL-BASED SUPERALLOYS. II. CREEP AT MEDIUM TEMPERATURE (760 DEGREESC)
CARRY, C.; HOUIS, C.; STRUDEL, J.L.
ECOLE NAT. SUPERIEURE DES MINES DE PARIS, EVRY, FRANCE
MEM. AND ETUD. SCI. REV. METALL. (FRANCE) VOL.78, NO.7-8 337-43 JULY-AUG. 1981
CODEN: MESMDJ

769913 A81101305
THE CONTROL OF SLIP DISTRIBUTION BY DUPLEX DISPERSIONS OF GAMMA MINUTES PHASE IN A NICKEL-BASED SUPERALLOY
MCGURRAN, B.; MARTIN, J.W.
DEPT. OF METALL., OXFORD UNIV., OXFORD, ENGLAND
Z. METALLKD. (GERMANY) VOL.72, NO.8 538-42 AUG. 1981
CODEN: ZEMTAE

767128 A81097907
CREEP PROPERTIES OF NICKEL-BASED SUPERALLOY SINGLE CRYSTALS. I. HIGH-TEMPERATURE CREEP (980 DEGREESC)
CARRY, C.; HOUIS, C.; STRUDEL, J.L.
MEM. AND ETUD. SCI. REV. METALL. (FRANCE) VOL.78, NO.3 139-46 MARCH 1981
CODEN: MESMDJ

701353 A81057638
ON THE IMPROVEMENT OF SULFIDATION RESISTANCE OF NICKEL-BASED SUPERALLOYS
JU CHOI; CHONG KEUN LEE; CHONG SOOL CHOI
KOREA INST. OF SCI. AND TECHNOL., SEOUL, KOREA
J. KOREAN INST. MET. VOL.18, NO.4 296-302 AUG. 1980
CODEN: KUHCAL

661812 A81031362
SILICON-CONTAINING COATINGS PRODUCED BY A CHEMICAL VAPOUR DEPOSITION METHOD ON NICKEL-BASED SUPERALLOYS
ITZHAK, D.; TULER, F.R.; SCHIEBER, M.
MATERIALS ENGNG. DEPT., BEN-GURION UNIV. OF THE NEGEV, BEER-SHEVA, ISRAEL
THIN SOLID FILMS (SWITZERLAND) VOL.73, NO.2 379-84 17 NOV. 1980
CODEN: THSFAP
INTERNATIONAL CONFERENCE ON METALLURGICAL COATINGS 21-25 APRIL 1980 SAN DIEGO, CA, USA

617091 A81003846
THE STUDY OF LOCAL PLASTIC STRAIN IN NICKEL-BASED SUPERALLOYS BY SELECTED AREA CHANNELING PATTERNS IN THE STEM
CROMPTON, J.S.; MARTIN, J.W.
DEPT. OF METALL. AND SCI. OF MATERIALS, UNIV. OF OXFORD, OXFORD, ENGLAND
METALLOGRAPHY (USA) VOL.13, NO.3 225-34 SEPT. 1980
CODEN: MEIJAP

598169 A80100844
COMBINED TEM, FIM, ATOM PROBE ANALYSIS OF A NICKEL BASED SUPERALLOY
BEAVEN, P.A.; DELARGY, K.M.; MILLER, M.K.; SMITH, G.D.W.
DEPT. OF METALL. AND SCI. OF MATERIALS, UNIV. OF OXFORD, OXFORD, ENGLAND
STURGESS, J.M. (Editors)
ELECTRON MICROSCOPY 1978. NINTH INTERNATIONAL CONGRESS ON ELECTRON MICROSCOPY 626-7 1978
Part I 1-9 AUG. 1978 TORONTO, CANADA
Publ: MICROSCOPICAL SOC. CANADA, TORONTO, CANADA
XXXII+684 pp. ISBN 0 920622 06 2

591493 A80097627
IMPROVED RESISTANCE TO CYCLIC OXIDATION OF A NICKEL-BASED SUPERALLOY BY HIGH TEMPERATURE ETCHING TREATMENT (HTET)
ITZHAK, D.; SCHIEBER, M.; TULER, F.R.
MATERIALS ENGNG. DEPT., BEN-GURION UNIV. OF THE NEGEV, BEER-SHEVA, ISRAEL
CORROS. SCI. (GB) VOL.20, NO.3 413-20 1980
CODEN: CRRSAA

542963 A80066552
THE EFFECT OF MINOR ELEMENTS ON THE HOT-WORKABILITY OF NICKEL-BASED SUPERALLOY
YAMAGUCHI, S.; KOBAYASHI, H.; MATSUMIYA, T.; HAYAMI, S.
FUNDAMENTAL RES. LABS., NIPPON STEEL CORP., KAWASAKI, KANAGAWA, JAPAN
PHILOS. TRANS. R. SOC. LONDON A (GB) VOL.295, NO.1413 122 1980
CODEN: PTRMAD

444199 A80003287
INTERACTION BETWEEN SILICON CARBIDE AND A NICKEL-BASED SUPERALLOY AT ELEVATED TEMPERATURES
MEHAN, R.L.; BOLON, R.B.
GENERAL ELECTRIC CO., CORPORATE RES. AND DEV., SCHENECTADY, NY, USA
J. MATER. SCI. (GB) VOL.14, NO.10 2471-81 OCT. 1979
CODEN: JMTSAS

322446 A79024674
HOT-CORROSION-RESISTANT DUPLEX COATINGS FOR A SUPERALLOY
RAIRDEN, J.R.
RES. AND DEV. CENTER, GENERAL ELECTRIC CO., SCHENECTADY, NY, USA
THIN SOLID FILMS (SWITZERLAND) VOL.53, NO.2 251-8 1 SEPT. 1978
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1978 SAN FRANSISCO, CA, USA
264243 A78085058
MODIFICATION OF THE MICROSTRUCTURE OF IN 100 BY SIMULATED COATING HEAT TREATMENTS
SCHUSTER, K.; BULLOCK, E.
Issued by: COMM. EUROPEAN COMMUNITIES, LUXEMBOURG;
1978
38 pp.
Report No.: EUR-5887EN

210426 A78048464
THE CREEP AND FRACTURE BEHAVIOUR OF THE CAST, NICKEL-BASED SUPERALLOY, IN100
DENNISON, J.P.; HOLMES, P.D.; WILSHIRE, B.
DEPT. OF METALL. AND MATERIALS TECHNOL., UNIV. COLL. OF SWANSEA, SWANSEA, WALES
MATER. SCI. AND ENG. (SWITZERLAND) VOL.33, NO.1 35-47
APRIL 1978
CODEN: MSCEAA

187616 A78035393
MICROSTRUCTURE AND MICROANALYSIS OF A CAST NICKEL BASED SUPERALLOY
BEAVEN, P.A.; MILLER, M.K.; SMITH, G.D.W.
MISELL, D.L. (Editors)
DEVELOPMENTS IN ELECTRON MICROSCOPY AND ANALYSIS 1977 199-202 1977
12-14 SEPT. 1977 GLASGOW, SCOTLAND
Publ: INST. PHYSICS, LONDON, ENGLAND
XIII+441 pp.

134190 A77090491
EPITAXIAL RESOLIDIFICATION IN LASER MELTED SUPERALLOYS
NARASIMHAN, S.L.; COPLEY, S.M.; VAN STRYLAND, E.W.; BASS, M.
UNIV. OF SOUTHERN CALIFORNIA, LOS ANGELES, CA, USA
Sponsor: IEEE; OPTICAL SOC. AMERICA
IEEE J. QUANTUM ELECTRON. (USA) VOL.QE-13, NO.9 2 SEPT. 1977
CODEN: IEJQA7
1977 IEEE/OSA CONFERENCE ON LASER ENGINEERING AND APPLICATIONS. (DIGEST OF TECHNICAL PAPERS) 1-3 JUNE 1977 WASHINGTON, D.C., USA

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Searcher: _____

Date: _____

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The METADEX database, produced by the American Society for Metals (ASM) and the Metals Society (London), provides comprehensive coverage of international literature on the science and practice of metallurgy. The database corresponds to the following printed publications: Review of Metal Literature (1966-1967), Metals Abstracts (1968 to the present), Alloys Index (1974 to the present), and Steels Supplement (1983-1984). The Metals Abstracts portion of the file includes references to about 1,200 primary journal sources. Alloys Index provides access to the records through commercial, numerical, and compositional alloy designations; specific metallic systems; and intermetallic compounds found within these systems. Abstracts are included for most records since 1979. In addition to specialized topics (including specific alloy designations, intermetallic compounds, and metallurgical systems), six basic categories of metallurgy are covered: materials, processes, properties, products, forms, and influencing factors.

SAMPLE RECORD

The positions of the key fields are shown in the following sample record.

```
AN      923344  85-560326
TI       Heat Treatment of Single Crystals.
AU        Field, T T ; Chem, O Y ; Geary, A R ; Salkeld, R W;
        Ulion, N E
CS        United Technologies Corp
PN AD     Patent: GB2141137A, UK  18 Apr. 1984
PY        12 Dec. 1984
JA        Journal Announcement: 8503
DT        Document Type: PATENT
AB        Single crystal superalloys with improved mechanical
        and creep properties are produced by heat treatment at
        temperatures just above the incipient melting
        temperature, followed by a holding time at that
        temperature, to permit diffusion and healing of the
        melt damage, prior to quenching. The process may be
        used to reclaim overheated single crystal superalloy
        articles. Details of a particular cycle applied to a
        specific superalloy composition (Ni--10% Cr--5%
        Al--1.5% Ti--4% W-12% Ta--5% Co) are disclosed.
CN DE     Descriptors: Superalloys, Heat treatment; Nickel
        base alloys, Heat treatment; Homogenizing; Diffusion
        annealing; Cooling rate
ES        Alloy Index(Identifier):Ni-10Cr-5Al-1.5Ti-4W-12Ta-5-
CC ID   Co, SP, NI
SH          Section Heading: 56  (THERMAL TREATMENT)
                (Copyright by the American Society for Metals and
                    the Metals Society, 1985.)
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Key to Data Fields

AB	Abstract	ID	Identifier
AD	Application Date	JA	Journal Announcement
AN	ASM Abstract Number	JN	Journal Name
AU	Author	LA	Language
CC	Alloy Class Code	PI	Periodic Index Term
CL	Conference Location	PN	Patent Number
CN	Alloy Class Name	PU	Publisher
CS	Corporate Source	PY	Publication Year
CT	Conference Title	RN	Report Number
CY	Conference Year	SH	Section Heading
DE	Descriptor	SH	Section Heading Code
DT	Document Type	SN	Intl. Standard Book or Serial No.(ISBN or ISSN)
ES	Element Symbol		
GN	Group Number	TI	Title

Data present in record depends on output format requested and type of record.

DIALOG File 32: Metadex - 66-86/May (COPR.1986 AM. SOC. METALS)

881519 84-510405
Melt Spinning Nickel-Based Superalloys.
Piggs, S J ; Charles, J A
Met. Technol., 10, (11), 435-438 Nov. 1983 ISSN: 0307-1693
Journal Announcement: 8403
Document Type: ARTICLE
Language: ENGLISH
The data relating to the production of tapes by chill-block melt spinning of a Ni-based crystalline superalloy (API) are compared with those presented by previous workers for amorphous and low-melting-point crystalline alloys. Comparisons based on fitting the data to established equations shed light upon the physical significance of the parameter nu sub p , the melt-pool viscosity. The effect of changing the alloy composition upon the form of the melt-spun product is also investigated. It is thought that the solidification and surface-tension characteristics of the alloy as well as the substrate material control the dimensions and thus the coherency of the tape produced. 9 ref.--AA

848484 83-140225
A Microstructural Model of High-Temperature Strength and Rupture Life Time for Second Phase Particle Hardened Alloys.
Reppich, B
Z. Metallkd., 73, (11), 697-705 Nov. 1982 ISSN: 0044-3093
Journal Announcement: 8306
Document Type: ARTICLE
Language: GERMAN
The interrelation between high-temperature strength, creep rupture life, as well as particle-microstructure is discussed for gamma '-precipitating nickel based superalloys. The idea that the operating dislocation--particle interaction directly affects the creep rupture life via the controlling mechanism of steady state creep is considered. A method is described to derive stress-rupture lifetime diagrams from creep data, and a model-orientated lifetime extrapolation is proposed which emphasizes, in particular, the principal role of the second phase particles including microstructural changes with time. 28 ref.--AA.

828599 82-321205
Enthalpy Measurement for Two Nickel-Based Superalloys.
Lamanthe, G ; Riquet, J P ; Bernard, C
Rev. Int. Hautes Temp. Refract., 18, (4), 265-277 1981 ISSN 0035-3434
Journal Announcement: 8212
Document Type: ARTICLE
Language: FRENCH
The enthalpies of solidification Delta H of two nickel-based superalloys were measured by D.T.A., the apparatus characteristics being determined by calibration. For NK15CATu Delta H = --350 J/g and for NK15CADT Delta H = --347 J/g with an experimental deviation of 10%. Results derived from a thermodynamic calculation based on the Ni--Co--Cr ternary system are in agreement with the measurements. 14 ref.--AA.

806730 82-540578
Precipitation in an As-Atomized Nickel-Based Superalloy Powder.
Ritter, A M ; Henry, M F
J. Mater. Sci., 17, (1), 73-80 Jan. 1982
Journal Announcement: 8205
Document Type: ARTICLE
Language: ENGLISH
The microstructure of Ar-atomized Rene 95 powder has been characterized by a combination of transmission and scanning transmission electron microscopy and energy dispersive X-ray analysis. Specimen preparation techniques have been developed to obtain samples suitable for such analyses and similar but complementary microstructural features are revealed by each technique. Dendritic and cellular structures, both on the surface of the powder particles and in the interior, are delineated by fine precipitates. These have been identified as MC-type carbides, containing Nb and Ti, with some Cr, Ni, Mo and tungsten. 9 ref.--AA

794597 82-120224
The Structures of Rapidly Quenched Nickel-Based Superalloy Ribbons Produced by Melt Spinning.
Davies, H A ; Shohoji, N ; Warrington, D H
Rapid Solidification Processing, Principles and Technologies.--II, Reston, Va., 23-26 Mar. 1980
153-164
Publ: Claitor's Publishing Division, 3165 S. Acadian Thruway, P.O. Box 3333, Baton Rouge, La. 70821, 1980
Journal Announcement: 8202
Document Type: BOOK
Language: ENGLISH
The influence of rapid quenching and of variations in cooling rate on microstructure in melt spun ribbon has been investigated for a number of Ni-based superalloys (Inconel 718, IN-100, Nimonic 80A and 115). An attempt is made initially to determine the relationship between ribbon thickness and cooling rate from the scale of the as-cast dendrite structure. The data suggest that the magnitude of the heat transfer coefficient between melt and chill surface is approx. independent of ribbon thickness and comparable with previous estimates for melt-spun Al alloys. The structures and patterns of segregation in compositions normally forged and in normally-cast alloys are revealed by optical and transmission electron microscopy and compared, where appropriate, with observations made on conventionally cooled bulk alloys. The development of the microstructure and properties on heat treatment is briefly discussed. 19 ref.--AA

791727 82-140048
The Conrol of Slip Distribution by Duplex Dispersions of gamma ' Phase in a Nickel--Based Superalloy.
McGurran, B ; Martin, J W

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DIALOG File 32: Metadex - 66-86/May (COPR.1986 AM. SOC. METALS)

Z. Metallkd., 72, (8), 538-542 Aug. 1981 ISSN: 0044-3093
Journal Announcement: 8201
Document Type: ARTICLE
Language: ENGLISH
The response to duplex ageing of Incoloy 901 has been examined, with the aim of producing a fine dispersion of the gamma ' phase to confer a high yield strength, together with a dispersion of larger gamma ' particles in order to induce homogenization of slip, the latter characteristic being considered to enhance resistance to fatigue failure. The peak hardness achieved is shown to be dependent on the difference in temperature between the lower and upper treatments. The time at the upper ageing temperature is limited by the formation of the eta -phase. Tensile tests at 575 deg C indicated an enhanced work hardening response compared with conventionally heat-treated alloy, and some evidence was obtained of slip homogenization through the formation of dislocation loops at the coarser gamma ' particles.--AA

775890 81-570501
Silicon-Containing Coatings Produced by a Chemical Vapour Deposition Method on Nickel-Based Superalloys.
Itzhak, D ; Tuler, F R ; Schieber, M
Thin Solid Films, 73, (2), 379-384 17 Nov. 1980 ISSN: 0040-6090
Journal Announcement: 8108
Document Type: ARTICLE
Language: ENGLISH
Proc. Int. Conf. Metallurgical Coatings, San Diego, California, U.S.A., Apr. 1980. Si-containing coatings were deposited on the Ni-based superalloy Hastelloy-X using the chemical vapour deposition technique. The coatings were obtained from gas mixtures of SiCl4--H2 and SiCl4--N2--H2. The molar ratio of the SiCl4 was 5 x 10--3 mol/l in a total flow of 3 l/min at atmospheric pressure through a 50 mm diameter reactor. The N2:H2 ratio was 3:1. The substrates were heated to the temperature range 850-1100 deg C on a graphite susceptor by an r.f. generator at 380 kHz. The coatings obtained in the temp. range 900-1000 deg C consisted of two layers. X-ray diffraction revealed the existence of the following silicide phases in the coatings: NiSi, Ni3Si, Ni16(Cr,Ti)6Si7 (G phase). No pure silicon was found on the coatings. 7 ref.--AA

775492 81-540661
Structure Development During Hot Pressing of a Nickel Based Superalloy APK 1.
Mitkov, M
Sintering Processes. Materials Science Research Vol. 13 [Proc. Conf.], Notre Dame, Ind., U.S.A., June 1979, 505-515 1980 ISSN: 030640336
Journal Announcement: 8108
Document Type: ARTICLE
Language: ENGLISH
See Met.A., 8102-72 0074. Hot pressing of APK 1 powder (a low C, Ni--Cr--Co alloy) produced a fully dense structure after 4h at 1100 deg C. Structure differences in the form of grain size, orientation of gamma ' precipitate, carbide distribution and lattice deformation of the gamma matrix depend on pressing conditions. During hot pressing, partial recrystallization occurs near the gamma solvus temp. and previous particle boundaries are retained as high angle grain boundaries. Heat treatment near the gamma ' solvus causes solution of some gamma ' precipitate. 8 ref.--R.W.

759097 81-540097
Structure Development During Hot Pressing of a Nickel-Based Superalloy APK 1.
Mitkov, M
Sintering Processes, Fifth International Conference on Sintering and Related Phenomena, Notre Dame, Ind., 18-20 June 1979
505-515
Publ: Plenum Press, 227 W. 17th St., New York, N.Y. 10011, 1980
Journal Announcement: 8103
Document Type: BOOK
Language: ENGLISH
Tests showed that during hot pressing of APK 1 powder fully dense samples are obtained. The material shows different structures depending on pressing conditions, the difference appearing as various grain sizes, orientation of gamma '-precipitates, carbide distribution and in lattice deformation of the gamma -matrix. Partial recrystallization occurs during hot pressing near the gamma '-solvus temp. Low-angle grain boundaries disappear and the previous particle boundaries are retained as high-angle grain boundaries.8 refs.--AA

756356 81-720056
Superalloys 1980.
Tien, J K ; Wlodek, S T ; Morrow, H ; III; Gell, M ; Mauer, G E
Champion, Pa., 21-25 Sept. 1980
Publ: American Society for Metals, Metals Park, Ohio 44073, 1980
Journal Announcement: 8102
Document Type: BOOK
Language: ENGLISH
Contents: L.R. CURWICK, W.A. PETERSEN and J.J. DeBARBADILLO, "Superalloy Scrap-Generation and Recycling"; M.J. WOULDS, "Recycling of Engine Serviced Superalloys"; G.E. MAURER, L.A. JACKMAN and J.A. DOMINGUE, "Role of Cobalt in Waspaloy"; E.P. WHELAN, "Cobalt-Free Nickel-Base Wrought Superalloys"; W.S. WANG, X.M. GUAN, H.Q. YE, J. BI and A.S. XU, "Effect of Silicon on Grain Boundary Carbide Precipitation and Properties of a Cobalt-Free Wrought Nickel-Base Superalloy"; D.L. SPONSELLER and W.C. HAGEL, "Cobalt-Free, Iron-Base Cast

(cont. next page)

DIALOG File 32: Metadex - 66-86/May (COPR.1986 AM. SOC. METALS)

Superalloy"; C. LUND and J.F. RADAVICH, "Effects of Refractory Additions on the Structure and Mechanical Properties of a Hafnium-Containing Nickel-Base Superalloy"; L. GAO, J. FU and C.X. CHEN, "Recent Advances in Understanding Electroslag Remelting Metallurgy of Superalloys"; C.L. JEANFILS, J.H. CHEN and H.J. KLEIN, "Modeling of Macrosegregation in Electroslag Remelting of Superalloys"; D.L. KLARSTROM, "Thermomechanical Processing of Haynes Alloy No. 188 Sheet to Improve Creep Strength"; E.W. KELLEY, "The Resistance to Deformation of Superalloys During Hot Rolling"; J.D. BUZZANELL and L.W. LHERBIER, "Processing Effects Vacuum Arc Remelting and Electroslag Remelting on the Nonmetallic Inclusion Content of MERL 76"; B.A. EWING, "A Solid-to-Solid HIP-Bond Processing Concept for the Manufacture of Dual-Property Turbine Wheels for Small Gas Turbines"; M.F. ROTHMAN and H.M. TAWANCY, "Effect of TMP Variables Upon Structure and Properties in ODS Alloy HDA 8077 Sheet"; D.B. SNOW, E.M. BREINAN and B.H. KEAR, "Rapid Solidification Processing of Superalloys Using High-Power Lasers"; M. GELL, D.N. DUHL and A.F. GIAMEI, "The Development of Single-Crystal Superalloy Turbine Blades"; T.E. STRANGMAN, G.S. HOPPIN, III, C.M. PHIPPS, K. HARRIS and R.E. SCHWER, "Development of Exothermically Cast Single-Crystal MAR-M 247 and Derivative Alloys"; G.S. HOPPIN, III, M. FUJII and L.W. SINK, "Development of Low-Cost Directionally-Solidified Turbine Blades"; L. OUICHOU, F. LAVAUD and G. LESOULT, "Influence of the Chemical Composition of Nickel-Base Superalloys on Their Solidification Behavior and Foundry Performance"; J.F. CHANG, G.P. HU and L. GUO, "Microstructure and Properties Analysis of the ESR-Cast-to-Shape Gas Turbine Disks"; K.C. ANTONY and J.F. RADAVICH, "The Metallurgical Aspects of Hot Isostatically Pressed Superalloy Castings"; Y.G. NAKAGAWA, A. OHOTOMO, Y. SAIGA, M. NEMOTO and H. SUTO, "Heat Treatment, Microstructure and Creep Strength of Gamma/Gamma Prime-Alpha Eutectic Directionally Solidified by Fluidized Bed Quenching"; S.W.K. SHAW, Response of IN-939 to Process Variations"; M. LAMBERIGTS, et al., "Hip'ing Various Precision Cast Engine Components in Nickel-Base Superalloys"; M.R. EDWARDS, "Castability of Corrosion-Resistant Superalloys"; G.K. BOUSE and P.W. SCHILKE, "Process Optimization of Cast Alloy 718 for Water-Cooled Gas Turbine Application"; W.H. SUTTON and W.A. JOHNSON, "Reactions Between Al203/MgO Crucible Materials and a Vacuum Melted Hafnium-Bearing Superalloy"; G. CHEN, et al., "Grain Boundry Embrittlement by Mu and Sigma Phases in Iron-Base Superalloys"; J.A. DOMINGUE, W.J. BOESCH and J.F. RADAVICH, "Phase Relationships in Rene 95"; C. AUBIN, J.W. DAVIDSON and J.P. TROTTIER, "The Influence of Powder Particle Surface Composition on the Properties of a Nickel-Based Superalloy Produced by Hot Isostatic Pressing"; G. CHEN, C. YAO and Z. ZHONG, "The Effect of Sigma Phase on the Mechanical Properties in Ni--Cr--Co Base Wrought Superalloys"; L.A. JACKMAN, H.B. CANADA and F.E. SCZERZENIE, "Quantitative Carbon Partitioning Diagrams for Waspaloy and Their Application to Chemistry Modifications and Processing"; S.R. HOLDSWORTH, "The Significance of Defects in Nickel-Base Superalloys"; R.A. MacKAY, R.L. DRESHFIELD and R.D. MAIER, "Anisotropy of Nickel-Base Superalloy Single Crystals'; C.J. SPENGLER, "Characterization of Corrosion Attack of Superalloys in Combustion Turbines in the Temperataure Range 600-760 deg C"; J.E. RESTALL, B.J. GILL, C. HAYMAN and N.J. ARCHER, "A Process for Protecting Gas Turbine Blade Cooling Passages Against Degradation"; A.M. BELTRAN and W.F. SCHILLING, "The Development and Evaluation of Diffusion-Bonded Clad Gas Turbine Buckets"; B. HU and H. LI, "Neutron Activated Microradiography Determination of Boron Distribution in a Cast Nickel Base Superalloy"; E.C. GUO and F.J. MA, "The Strengthening Effect of Niobium on Ni--Cr--Ti Type Wrought Superalloys"; R.D. FIELD, A.R. COX and H.L. FRASER, "Microstructure of Rapidly Solidified Powders"; M. DAHLEN and H. FISCHMEISTER, "Carbide Precipitation in Superalloys"; R.K. HOTZLER and T.K. GLASGOW, "Recrystallization Characteristics of Oxide Dispersion Strengthened Nickel-Base Alloys"; Z. YUNRONG and C. YULIN, "Phase Transformations in Hafnium-Bearing Cast Nickel-Base Superalloys"; R.A. MILLER, S.R. LEVINE and P.E. HODGE, "Thermal Barrier Coatings for Superalloys"; R. TANAKA, et al., "Strengthening Factors and Phase Relation in Ni--Cr--W Alloys Developed for Nuclear Steelmaking"; R.D. ENG and D.J. EVANS, "High-Strength HIP Consolidated MERL 76 Disks"; D.M. CARLSON, "P/M AF115 Dual-Property Disk Process Development"; D.D. PEARSON, F.D. LEMKEY and B.H. KEAR, "Stress Coarsening of Gamma Prime and Its Influence on Creep Properties of a Single-Crystal Superalloy"; D.F. SMITH, E.F. CLATWORTHY, D.G. TIPTON and W.L. MANKINS, "Improving the Notch-Rupture Strength of Low-Expansion Superalloys"; T. KHAN, J.F. STOHR and H. BIBRING, "Cotac 744: an Optimized D.S. Composite for Turbine Blades"; R.C. BENN, "Oxide Dispersion-Strengthened Majority Gamma Prime Phase Nickel-Base Superalloy"; Y.G. KIM and H.F. MERRICK, "Fatigue Properties of MA 6000E, a Gamma Prime Strengthened ODS Alloy"; T.E. HOWSON, F. COSANDEY and J.K. TIEN, "Creep Deformation and Rupture of Oxide Dispersion Strengthened Inconel MA 754 and MA 6000E"; W.H. WIEGERT and R.J. HENRICKS, "Tensile and Creep-Rupture Behavior of Two Advanced Oxide Dispersion-Strengthened Sheet Alloys"; E. HORNBOGEN and C. VERPOORT, "Influence of Surface Treatments on Fatigue Crack Initiation in Gamma + Gamma Prime-Precipitation Hardening Alloys"; S. FLOREEN and R.H. KANE, "Controlling Intermediate Temperature Fatigue Crack Growth in a Nickel-Base Superalloys by Microstructural Variations"; S.D. ANTOLOVICH, R. BAUR and S. LIU, "A Mechanistically Based Model for High-Temperature LCF of Nickel-Base Superalloys"; H.W. SHEN and Q.G. CAI, "Elastic Plastic Analysis and Experiment of Strain Control LCF Life and Stress Rupture Life of Precracked Superalloy"; A.C. CHANG, Y.K. BAI, Y.T. XIAO, C.P. KUNG and C.H. SHIH, "The Interaction of Creep and Fatigue in Two Wrought Superalloys"; D.A. WOODFORD and R.H. BRICKNELL, "The Effect of High-Temperature Air Exposure on the Stress Rupture Life of Nickel and Cobalt-Base Superalloys"; W. BETZ, B. BORCHERT and W. TRACK, "Comparative Assessment of PM Material for Turbine Disks"; C.C. LAW and M.J. BLACKBURN, "Notch-Rupture Behavior of a Nickel-Base Superalloy at Intermediate Temperatures"; M. McLEAN, "Friction Stress and

(cont. next page)

DIALOG File 32: Metadex - 66-86/May (COPR.1986 AM. SOC. METALS)

Recovery in Creep of Nickel-Base Superalloys"; J.P. DENNISON, I.C. ELLIOTT and B. WILSHIRE, "An Assessment of Hot Isostatic Pressing and Reheat Treatment for the Regeneration of Creep Properties of Superalloys"; R.R. JENSEN, T.E. HOWSON and J.K. TIEN, "Very Slow Strain Rate Stress--Strain Behavior and Resisting Stress for Creep in a Nickel-Base Superalloy"; P.K. WRIGHT and A.F. ANDERSON, "The Influence of Orientation on the Fatigue of Directionally Solidified Superalloys"; G.B. THOMAS and T.B. GIBBONS, "The Effect of Small Amounts of Lead on the Creep Performance of a Cast Ni--Cr Base Alloy".

755587 81-540059

The Influence of Powder Particle Surface Composition on the Properties of a Nickel-Based Superalloy Produced by Hot Isostatic Pressing.

Aubin, C ; Davidson, J H ; Trottier, J P

Superalloys 1980, Champion, Pa., 21-25 Sept. 1980

345-354

Publ: American Society for Metals, Metals Park, Ohio 44073, 1980

Journal Announcement: 8102

Document Type: BOOK

Language: ENGLISH

The present work was carried out on PM Astroloy with varying carbon, oxygen and sulfur contents, produced either by Ar atomization (mean particle dia. 60 mu m) or by the rotating electrode process (mean particle dia. 450 mu m). The first aim was to examine the microstructure and the composition of the particle surfaces and to determine the nature and the quantity of the gases desorbed during heating under vacuum. The experimental techniques employed were transmission electron microscopy, Auger electron spectroscopy and mass spectrometry. For the different types of powder, significant variations were observed in the amounts of amorphous and combined C are in the quantity of the adsorbed species. The second goal was to study the relation between surface analysis and the mechanical properties after densification. Significant effects of C and O levels were observed on tensile, impact and creep properties, whereas, within the limited range of concentrations investigated, the influence of S content could not be clearly established.10 refs.--AA

727958 80-720353

Residuals, Additives and Materials Properties.

Joint Conference by the National Physical Laboratory, the Royal Society and the Metals Society, London, England, 15-17 May 1978

First published in Philos. Trans. R. Soc. London A, 1980, 295, (413). Pp 341, A4, illustrated

Publ: The Royal Society, 6 Carlton House Terrace, London SW1Y 5AG, 1980

Journal Announcement: 8009

Document Type: BOOK

Language: ENGLISH

Some of the papers below are presented as extended abstracts only. For these, the place of publication of the full paper is given together with the Metals Abstracts number where possible. Contents include: E.D. HONDROS, 'Residuals and Properties'; J.H. WESTBROOK, 'Problems with Residual and Additive Elements and their Control Through Specifications'; A.J. HARTLEY et al., 'Steelworks Control of Residuals'; J.A. CHARLES, 'Recycling Effects on the Composition of Non-Ferrous Metals'; D.T. LLEWELLYN et al., 'The Effects of Residual Elements on the Properties of Engineering Steels'; B. MILLS, 'Effect of Residual Elements on the Machinability of Leaded Free Machining Steels'; D.A. MELFORD, 'The Influence of Residual and Trace Elements on Hot Shortness and High Temperature Embrittlement'; J.L. ROBINSON and M.H. SCOTT, 'Liquation Cracking During the Welding of Austenitic Stainless Steels and Nickel Alloys'; K. SACHS, 'The Role of Residuals in Engineering Steels' (see Met. Technol., 1979, 6, 33; Met. A., 7904-71 0247); S YAMAGUCHI et al., 'The Effect of Minor Elements on the Hot-Workability of Nickel-Based Superalloys' (see Met. Technol., 1979, 6, 170; Met. A., 7910-31 2524); J.P. CHUBB et al., 'The Effect of Alloying and Residual Elements on the Strength and Hot Ductility of Cast Cupro-Nickel' (see J. Met., 1978, 30, 20; Met. A., 7808-31 2158); B. MINTZ and J.M. ARROWSMITH, 'The Hot Ductility Behaviour of C--Mn--Nb--Al Steels and Its Relation to Crack Propagation During the Straightening of Concast Strand' (see Met. Technol., 1979, 6, 24; Met. A., 7904-31 1032); W.J. JACKSON and D.M. SOUTHALL, 'The Effect of Trace Elements (Cu and Sn) on Mechanical Properties of Steel Castings' (see Met. Technol., 1978, 5, 381; Met. A., 7903-31 0750); B.A. PARKER, 'The Effect of Minor Element Concentrations on the Strain Rate Sensitivity and Ductility of Commercial Purity Aluminium Sheet' (see Proc. Int. Conf. Strength of Metals and Alloys, Vol. 2, p 899 (Pergamon, 1979)); A.R. WAUGH et al., 'Imaging Atom Probe Microscopy for Segregation Studies' (see Surf. Sci., 1979, 89, 718); C. LEA et al., 'Categorizing the Embrittling Residuals in Engineering Alloys by Auger Electron Spectroscopy' (see Mater. Sci. Eng., 1980, 42, 233); P. DOIG and P.E.J. FLEWITT, 'X-Ray Microanalysis of Grain Boundary Segregation in Steels by S.T.E.M.' (see Philos. Mag. A, 1978, 37, 759); J.P. HIRTH, 'Adsorption at Grain Boundaries and its Effect on Decohesion'; R.J. ASARO, 'Adsorption-Induced Losses in Interfacial Cohesion'; R.C. POND and D.A. SMITH, 'Plasticity of Grain Boundaries' (see Acta Crystallogr. A, 1979, 35, 689); M. GUTTMANN, 'The Role of Residuals and Alloying Elements in Temper Embrittlement'; D.R. HARRIES and A.D. MARWICK, 'Non-Equilibrium Segregation in Metals and Alloys'; P. LEMBLE et al., 'Temper Embrittlement at High Alloy Contents: a 12%Cr Martensitic Steel' (see Met. Sci., 1979, 13, 496; Met. A, 7912-31 3103); P.E. IRVING and A. KURZFELD, 'Interaction Effects Between Trace Element Impurities and Environment in Fatigue of High Strength Steels' (see Met. Sci., 1978, 12, 495; Met A., 7902-31 0387); H.R. TIPLER, 'The Influence of Purity on the Strength and Ductility in Creep of CrMoV Steels of Varied Microstructures'; B.L. KING, 'Intergranular Embrittlement in CrMoV Steels: An Assessment of the Effects of

(cont. next page)

DIALOG File 32: Metadex - 66-86/May (COPR.1986 AM. SOC. METALS)

Residual Impurity Elements on High Temperature Ductility and Crack Growth'; A.D. BATTE et al., 'The Effects of Residual Elements and Deoxidation Practice on the Mechanical Properties and Stress Relief Cracking Susceptibility of 0.5%CrMoV Turbine Castings'; M.P. SEAH, 'Impurities, Segregation and Creep Embrittlement'; N.G. NEEDHAM and J. ORR, 'The Effect of Residuals on the Elevated Temperature Properties of Some Creep Resistant Steels'; J. MYERS, 'The Influence of Impurity and Alloy Content on Stress Relief Cracking in CrMoV Steels' (see Met. Technol., 1978, 5, 391; Met. A., 7903-31 0751); R.G. THOMAS, 'High Temperature Mechanical Properties of AISI 316 Weld Metal' (see A.S.T.M. STP 679, 1979); A.D. BATTE and M.C. MURPHY, 'Reheat Cracking in 2.25CrMo Weld Metal: The Influence of Residual Elements and Microstructure' (see Met. Technol., 1979, 6, 62; Met. A., 7906-55 0827); D.J. GOOCH, 'Creep Crack Growth in 2.25CrMo Weld Metals: The Suppression of Trace Element Embrittlement by Creep Strength Effects' (see Proc. 5th Bolton Landing Conf., 1978, p 393); G.B. THOMAS and T.B. GIBBONS, 'The Influence of Trace Elements on the Creep and Stress-Rupture Properties of Nimonic 105' (see Met. Technol., 1979, 6, 95; Met. A., 7910-31 2514); M.P. SEAH et al., 'Investigation of an Additive Remedy for Temper Brittleness' (see Met. Sci., 1979, 13, 307; Met. A., 7912-31 3097); C.L. WHITE et al., 'The Effect of Trace Element Additions on the Grain Boundary Composition of Ir + 0.3% W Alloys' (see Metall. Trans. A, 1979, 10, 683; Met. A., 7909-12 1121); G.M. PRESSOUYRE and I.M. BERNSTEIN, 'Titanium: A Hydrogen Trap in Iron' (see Acta Metall., 1979, 27, 89; Met. A., 7905-35 0820); J.E. HARRIS, 'The Role of Intergranular Precipitates in Controlling Creep Cavitation' (see Met. Sci., 1978, 12, 321; Met. A., 7810-13 0781 and 7712-13 0841); D.P. WHITTLE and J. STRINGER, 'Improvements in High Temperature Oxidation Resistance by Additions of Reactive Elements or Oxide Dispersions'; R.A. COLLINS et al., 'The Effect of Rare-Earth Impurities on the Oxidation Resistance of Chromium' (see J. Phys. F (Met. Phys.), 1979, 9, 1245; Met. A., 7909-35 1388); E. BULLOCK et al., 'Benefits of Minor Additions of Yttrium to the Oxidation and Creep Behaviour of a Nickel-Based Composite' (see Met. Sci., 1979, 13, 373; Met. A., 7910-35 1524); D.J. COATES and A. HENDRY, 'The Influence of Nitrogen on the Oxidation Resistance of Low Alloy Steels' (see Met. Sci., 1979, 13, 315; Met. A., 7912-35 1847).

201404 70-120129
MICROSTRUCTURE OF NICKEL-BASED SUPERALLOYS
SABOL, G P ; STICKLER, R
PHYSICA STATUS SOLIDI 1 SEPT. 1969, 35, --1--, 11-52,
Journal Announcement: 7002
Document Type: ARTICLE
Language: ENGLISH

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SAMPLE RECORD

The positions of the key fields are shown in the following sample record.

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AN SF  384567      C79022216
TI       WHICH MICROPROCESSOR SYSTEM FOR THE BEGINNER?
         CRITICAL FACTORS FOR THE CHOICE
AU       RUNGE, H.
JN       FUNKSCHAU (GERMANY)    VOL.50,  NO.26    1338-9    15
PY CO  DEC. 1978   Coden: FUSHA2
TC       Treatment: PRACTICAL
DT       Document Type: JOURNAL PAPER
LA       Languages: GERMAN
AB       DESCRIBES SOME OF THE MAIN CHARACTERISTICS OF HOME
         COMPUTER PACKAGES AT PRESENT AVAILABLE. THE READER IS
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         EXPENSIVE EXTRA EQUIPMENT AND GIVES POOR VALUE IN OTHER
         RESPECTS.
DE       Descriptors: PERSONAL COMPUTING; MICROCOMPUTERS;
         COMPUTER SELECTION AND EVALUATION
ID       Identifiers: CHOICE; CHARACTERISTICS; HOME COMPUTER
         PACKAGES; VALUE; MICROPROCESSOR SYSTEM
CC       Class Codes: C7830
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                 ineers, 1982.
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Key to Data Fields

AB	Abstract	DT	Document Type
AN	Abstract Number	ID	Identifier
AU	Author	JN	Journal Name
BN	ISBN	LA	Language
CC	Class Code	PU	Publisher
CL	Conference Location	PY	Publication Year
CO	CODEN	RN	Report Number
CS	Corporate Source	SF	Subfile
CT	Conference Title	TC	Treatment Code
CY	Conference Year	TI	Title
DE	Descriptor		

Data present in record depends on output format requested and type of record.

DIALOG File 13: INSPEC - 77-86/ISS12 (COPR. IEE 1986) See File 12(1969 thru 1976)

1609781 A86026992
Compression studies of a nickel-based superalloy, MAR-M200, and of Ni/sub 3/Al
Mauer, F.A.; Munro, R.G.; Piermarini, G.J.; Block, S.; Dandekar, D.P.
Center for Mater. Sci., NBS, Gaithersburg, MD, USA
J. Appl. Phys. (USA) vol.58, no.10 3727-30 15 Nov. 1985
CODEN: JAPIAU ISSN: 0021-8979
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: ENGLISH
(13 Refs)
The lattice parameter of a cubic nickel-based alloy, MAR-M200, has been determined as a function of pressure for 0<p<14 GPa at room temperature. A similar study was made for Ni/sub 3/Al in the range 0<p<11 GPa at room temperature. In both cases, the diamond anvil pressure cell was used in conjunction with the energy dispersive method of X-ray diffraction. The data were analyzed in the context of model equations of state and in comparison with other results from ultrasonic studies.

1361074 A85003581
THE EFFECT OF GRAIN-BOUNDARY MICROSTRUCTURE ON CAVITY NUCLEATION IN A NICKEL-BASED SUPERALLOY
BARLOW, C.Y.
DEPT. OF METALL., CAMBRIDGE UNIV., ENGLAND
BILDE-SORENSEN, J.B.; HANSEN, N.; HORSEWELL, A.; LEFFERS, T.; LIHOLT, H. (Editors)
DEFORMATION OF MULTI-PHASE AND PARTICLE CONTAINING MATERIALS. PROCEEDINGS OF THE 4TH RISO INTERNATIONAL SYMPOSIUM ON METALLURGY AND MATERIALS SCIENCE 139-44 1983
5-9 SEPT. 1983 ROSKILDE, DENMARK
Publ: RISO NAT. LAB., ROSKILDE, DENMARK
596 pp.
Treatment: EXPERIMENTAL
Document Type: CONFERENCE PAPER
Languages: ENGLISH
(9 Refs)
A STUDY IS PRESENTED OF GRAIN-BOUNDARY CAVITATION PRODUCED IN NIMONIC 80A BY COLD-DEFORMATION AND STRESS-FREE ANNEALING. THE CAVITIES WERE FOUND TO ORIGINATE EITHER FROM TRANSVERSE CRACKING, OF CARBIDE PARTICLES, OR FROM DECOHESION OF THE PARTICLE-GRAIN BOUNDARY INTERFACES. THIS DECOHESION COULD OCCUR EITHER DURING DEFORMATION, OR DURING ANNEALING. THE CAVITIES WERE INVARIABLY LOCATED AT OR CLOSE TO THE POINT OF IMPINGEMENT OF A MATRIX SLIP BAND ON THE GRAIN BOUNDARY, BUT NOT ALL SLIP BANDS AT A PARTICULAR BOUNDARY WERE ASSOCIATED WITH CAVITATION. QUANTITATIVE EVIDENCE IS PRESENTED SHOWING THAT THE MEAN NUMBER OF DISLOCATIONS ASSOCIATED WITH EACH SLIP BAND INCREASES WITH MACROSCOPIC STRAIN, BUT THERE IS CONSIDERABLE VARIATION BETWEEN SLIP BANDS. THIS ACCOUNTS FOR THE DIFFERENTIAL ABILITY OF SLIP BANDS TO RESULT IN CAVITY NUCLEATION.

1161390 A83120322
PROCESS AND STRUCTURAL ASPECTS OF MELT-SPUN NICKEL-BASED SUPERALLOY RIBBONS
LIEBERMANN, H.H.; MAXWELL, R.E.; SMASHEY, R.W.; WALTER, J.L.
GENERAL ELECTRIC CORPORATE RES. AND DEV., SCHENECTADY, NY, USA;
METALL. TRANS. A (USA) VOL.14A, NO.9 1817-23 SEPT. 1983
CODEN: MTTABN ISSN: 0360-2133
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: ENGLISH
(30 Refs)
VARIOUS EXPERIMENTAL ASPECTS REGARDING THE CHILL BLOCK MELT-SPINNING OF NICKEL-BASE SUPERALLOY RIBBONS HAVE BEEN INVESTIGATED. HIGH SPEED MOVIES HAVE BEEN USED TO CHARACTERIZE THE PROCESS, WHICH IS FOUND TO OBEY EMPIRICAL EQUATIONS AREADY ESTABLISHED FOR AMORPHOUS AND LOW MELTING TEMPERATURE CRYSTALLINE ALLOYS. EXTENSIVE CHARACTERIZATION OF RIBBONS FORMED HAS BEEN USED TO ASSESS VARIATIONS IN SOLIDIFICATION RATE CAUSED BY THE ADJUSTMENT OF PROCESS PARAMETERS. VARIOUS RIBBON MICROSTRUCTURES ARE RELATED TO THE COOLING RATE AT LOCAL POINTS WITHIN THE RIBBON DURING MELT-SPINNING AND ARE EXPLAINED IN TERMS OF THE EFFECTS OF LIMITED SAMPLE-SUBSTRATE WETTING AND RIBBON THICKNESS. THEORETICAL AND EXPERIMENTAL FACTORS AFFECTING MICROSTRUCTURAL DEVELOPMENT ARE DISCUSSED.

1004500 A83024361
A MICROSTRUCTURAL MODEL OF HIGH-TEMPERATURE STRENGTH AND RUPTURE LIFE TIME FOR SECOND PHASE PARTICLE HARDENED ALLOYS
REPPICH, B.
INST. FUR WERKSTOFFWISSENSCHAFTEN I, UNIV. ERLANGEN-NURNBERG, ERLANGEN, GERMANY
Z. METALLKD. (GERMANY) VOL.73, NO.11 697-705 NOV. 1982
CODEN: ZEMTAE ISSN: 0044-3093
Document Type: JOURNAL PAPER
Languages: GERMAN
(28 Refs)
IN A SERIES OF STUDIES THE INTERRELATION BETWEEN HIGH-TEMPERATURE STRENGTH, CREEP RUPTURE LIFE, AS WELL AS PARTICLE-MICROSTRUCTURE IS DISCUSSED FOR GAMMA'-PRECIPITATING NICKEL BASED SUPERALLOYS. THE AUTHOR OUTLINES THE THEORETICAL CONCEPT. IT STARTS ON THE IDEA THAT THE OPERATING DISLOCATION-PARTICLE INTERACTION DIRECTLY AFFECTS THE CREEP RUPTURE LIFE VIA THE CONTROLLING MECHANISM OF STEADY STATE CREEP. A METHOD IS DESCRIBED TO DERIVE STRESS-RUPTURE LIFETIME DIAGRAMS FROM CREEP DATA, AND A MODEL-ORIENTED LIFETIME EXTRAPOLATION IS PROPOSED WHICH EMPHASIZES, IN PARTICULAR, THE PRINCIPAL ROLE OF THE SECOND PHASE PARTICLES INCLUDING MICROSTRUCTURAL CHANGES WITH TIME.

DIALOG File 13: INSPEC - 77-86/ISS12 (COPR. IEE 1986) See File 12(1969 thru 1976)

949730 A82105153
LONG-TERM GROWTH OF SUPERALLOY GAMMA MINUTES PARTICLES
FOOTNER, P.K.; RICHARDS, B.P.
GEC HIRST RES. CENTRE, WEMBLEY, ENGLAND
J. MATER. SCI. (GB) VOL.17, NO.7 2141-53 JULY 1982
CODEN: JMTSAS
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: ENGLISH
(22 Refs)
THE MICROSTRUCTURES OF FIVE COMMERCIALLY AVAILABLE NICKEL-BASED SUPERALLOYS, (NIM80A, NIM90, NIM105, IN738, IN939) HAVE BEEN STUDIED AFTER HEAT-TREATMENTS AT FOUR DIFFERENT TEMPERATURES AND FOR TIMES UP TO 15000 H (170 SAMPLES). IN ALL CASES FOR MODERATE TIMES AND TEMPERATURES THE MEAN GAMMA MINUTES DIMENSION INCREASED LINEARLY WITH THE CUBE ROOT OF TIME WITH AN ACTIVATION ENERGY OF 250 TO 272 KJ MOL/SUP -1/ K/SUP -1/. HOWEVER, AT HIGH VALUES OF TIME AND TEMPERATURE SOME DEVIATIONS FROM THIS BEHAVIOUR WERE OBSERVED ON TWO OF THE SUPERALLOYS. THESE WERE ACCOMPANIED BY MARKED MORPHOLOGICAL CHANGES THOUGHT TO BE DUE TO RE-SOLUTION EFFECTS. EXTENDED ANALYSIS OF THE PARTICLE-SIZE DISTRIBUTIONS SUGGESTS A CORRELATION WITH THE DISTRIBUTION FUNCTIONS PREDICTED BY THE LIFSCHITZ-SLYOSOV THEORY MODIFIED TO TAKE ACCOUNT OF ENCOUNTERS BETWEEN GROWING PARTICLES. THE MICROSTRUCTURAL DATA SO OBTAINED HAVE BEEN USED IN FAILURE DIAGNOSIS. ATTEMPTS HAVE BEEN MADE TO EXPLAIN THE CHANGES IN GAMMA MINUTES SHAPE WITH RESPECT TO LONG-TERM COMPOSITION.

853680 A82047032
PRECIPITATION IN AN AS-ATOMIZED NICKEL-BASED SUPERALLOY POWDER
RITTER, A.M.; HENRY, M.F.
CORP. RES. AND DEV., GENERAL ELECTRIC CO., SCHENECTADY, NY, USA
J. MATER. SCI. (GB) VOL.17, NO.1 73-80 JAN. 1982
CODEN: JMTSAS
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: ENGLISH
(9 Refs)
THE MICROSTRUCTURE OF ARGON-ATOMIZED RENE 95 POWDER HAS BEEN CHARACTERIZED BY A COMBINATION OF TRANSMISSION AND SCANNING-TRANSMISSION ELECTRON MICROSCOPY, AND ENERGY DISPERSIVE X-RAY ANALYSIS. SPECIMEN PREPARATION TECHNIQUES HAVE BEEN DEVELOPED IN ORDER TO OBTAIN SAMPLES SUITABLE FOR SUCH ANALYSES, AND SIMILAR BUT COMPLEMENTARY MICROSTRUCTURAL FEATURES ARE REVEALED BY EACH TECHNIQUE. DENDRITIC AND CELLULAR STRUCTURES, BOTH ON THE SURFACE OF THE POWDER PARTICLES AND IN THE INTERIOR, ARE DELINEATED BY FINE PRECIPITATES. THESE HAVE BEEN IDENTIFIED AS MC-TYPE CARBIDES, CONTAINING NB AND TI, WITH SOME CR, NI, MO AND W.

849216 A82041610
PRECIPITATION OF HFC IN MM-002
SPILLING, P.D.; MARTIN, J.W.
DEPT. OF METALL. AND SCI. OF MATERIALS, OXFORD UNIV., OXFORD, ENGLAND
METALLOGRAPHY (USA) VOL.15, NO.1 63-71 FEB. 1982
CODEN: MEIJAP
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: ENGLISH
(2 Refs)
THE EFFECT OF PROLONGED EXPOSURE TO HIGH TEMPERATURE (1050 DEGREESC) UPON THE MICROSTRUCTURE OF THE NICKEL-BASED SUPERALLOY MM-002 HAS BEEN INVESTIGATED. THE 'SCRIPT' (TA, TI, HF)C CARBIDES INITIALLY PRESENT WERE SEEN TO BE UNSTABLE, AND PRECIPITATION OCCURRED BOTH OF M/SUB 6/C AND OF AN HF-RICH MC PHASE. THE ORIENTATION RELATIONSHIP WITH THE MATRIX OF THE HFC PHASE WAS DETERMINED AS (001)/SUB M/>(210)/SUB HFC/; (110)/SUB M/>(12>0)/SUB HFC/. A HABIT PLANE OF THE PRECIPITATE IS SUGGESTED, NAMELY (111)/SUB M/>(21>0)/SUB HFC/.

661812 A81031362
SILICON-CONTAINING COATINGS PRODUCED BY A CHEMICAL VAPOUR DEPOSITION METHOD ON NICKEL-BASED SUPERALLOYS
ITZHAK, D.; TULER, F.R.; SCHIEBER, M.
MATERIALS ENGNG. DEPT., BEN-GURION UNIV. OF THE NEGEV, BEER-SHEVA, ISRAEL
THIN SOLID FILMS (SWITZERLAND) VOL.73, NO.2 379-84 17 NOV. 1980
CODEN: THSFAP
INTERNATIONAL CONFERENCE ON METALLURGICAL COATINGS 21-25 APRIL 1980 SAN DIEGO, CA, USA
Treatment: EXPERIMENTAL
Document Type: CONFERENCE PAPER
Languages: ENGLISH
(7 Refs)
SILICON-CONTAINING COATINGS WERE DEPOSITED ON THE NICKEL-BASED SUPERALLOY HASTELLOY-X USING THE CHEMICAL VAPOUR DEPOSITION TECHNIQUE. THE COATINGS WERE OBTAINED FROM GAS MIXTURES OF SICL/SUB 4/-H/SUB 2/ AND SICL/SUB 4/-N/SUB 2/-H/SUB 2/. THE MOLAR RATIO OF THE SICL/SUB 4/ WAS 5*10/SUP -3/ MOL 1/SUP -1/ IN A TOTAL FLOW OF 3 1 MIN/SUP -1/ AT ATMOSOPHERIC PRESSURE THROUGH A 50 MM DIAMETER REACTOR. THE N/SUB 2/:H/SUB 2/ RATIO WAS 3:1. THE SUBSTRATES WERE HEATED TO THE TEMPERATURE RANGE 850-1100 DEGREESC ON A GRAPHITE SUSCEPTOR BY AN RF GENERATOR AT 380 KHZ. THE COATINGS OBTAINED IN THE TEMPERATURE RANGE 900-1000 DEGREESC CONSISTED OF TWO LAYERS. X-RAY DIFFRACTION REVEALED THE EXISTENCE OF THE FOLLOWING SILICIDE PHASES IN THE COATINGS: NISI, NI/SUB 3/SI, NI/SUB 16/(CR,TI)/SUB 6/SI/SUB 7/ (G PHASE). NO PURE SILICON WAS FOUND ON THE COATINGS.

DIALOG File 13: INSPEC - 77-86/ISS12 (COPR. IEE 1986) See File 12(1969 thru 1976)

591493 A80097627
IMPROVED RESISTANCE TO CYCLIC OXIDATION OF A NICKEL-BASED SUPERALLOY BY HIGH TEMPERATURE ETCHING TREATMENT (HTET)
ITZHAK, D.; SCHIEBER, M.; TULER, F.R.
MATERIALS ENGNG. DEPT., BEN-GURION UNIV. OF THE NEGEV, BEER-SHEVA, ISRAEL
CORROS. SCI. (GB) VOL.20, NO.3 413-20 1980
CODEN: CRRSAA
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: ENGLISH
(8 Refs)
A METHOD TO INCREASE THE CYCLIC OXIDATION RESISTANCE OF A CHROMIUM AND MOLYBDENUM RICH NICKEL-BASED SUPERALLOY, HASTELLOY-X 48 NI-22CR-18FE-9MO), IS PRESENTED, IN WHICH THE CYCLIC OXIDATION RESISTANCE IS INCREASED AT 1100 DEGREESC. THE TIME AFTER WHICH THE TOTAL WEIGHT CHANGE BECOMES ZERO IS INCREASED FROM 100 TO BETWEEN 400 AND 500 H. THE METHOD CONSISTS OF THERMALLY ETCHING THE ALLOY WITH GASEOUS HYDROCHLORIC ACID (HCL) AT 1100 DEGREESC FOR APPROXIMATELY 0.5 H. THE MECHANISM OF THE INCREASED OXIDATION RESISTANCE WAS INVESTIGATED USING METALLOGRAPHY, X-RAY DIFFRACTION AND ELECTRON MICROPROBE ANALYSIS. AS A RESULT OF THE HTET, A THICK AND CONTINUOUS PROTECTIVE SUBSCALE OF CR/SUB 2/O/SUB 3/ IS FORMED DURING THE OXIDATION WHICH ACTS AS AN EFFICIENT DIFFUSION BARRIER AGAINST FURTHER OXIDATION.

264243 A78085058
MODIFICATION OF THE MICROSTRUCTURE OF IN 100 BY SIMULATED COATING HEAT TREATMENTS
SCHUSTER, K.; BULLOCK, E.
Issued by: COMM. EUROPEAN COMMUNITIES, LUXEMBOURG;
1978
38 pp.
Report No.: EUR-5887EN
Treatment: EXPERIMENTAL
Document Type: REPORT
Languages: ENGLISH
(15 Refs)
THE APPLICATION OF CORROSION RESISTANT INTERMETALLIC COATINGS TO NICKEL BASED SUPERALLOYS HAS BEEN REPORTED AS HAVING AN ADVERSE EFFECT ON THE MECHANICAL PROPERTIES (CREEP AND FATIGUE) OF THE SUBSTRATE ALLOYS. AN INVESTIGATION INTO THE MICROSTRUCTURAL EFFECTS OF COATING/CREEP INTERACTION ON ALLOY IN 100 HAS BEEN INITIATED. AS A BASIS FOR COMPARISON, THE ALLOY HAS BEEN SUBJECTED TO A NUMBER OF HEAT TREATMENTS DESIGNED TO SIMULATE COATING PROCESSES, AND THE EFFECT ON THE CREEP CONTROLLING PARAMETERS, GRAIN SIZE, POROSITY, CARBIDE AND GAMMA' PRECIPITATES HAS BEEN ASSESSED.

187616 A78035393
MICROSTRUCTURE AND MICROANALYSIS OF A CAST NICKEL BASED SUPERALLOY
BEAVEN, P.A.; MILLER, M.K.; SMITH, G.D.W.
MISELL, D.L. (Editors)
DEVELOPMENTS IN ELECTRON MICROSCOPY AND ANALYSIS 1977
199-202 1977
12-14 SEPT. 1977 GLASGOW, SCOTLAND
Publ: INST. PHYSICS, LONDON, ENGLAND
XIII+441 pp.
Treatment: EXPERIMENTAL
Document Type: CONFERENCE PAPER
Languages: ENGLISH
(6 Refs)
THE AUTHORS DESCRIBE PRELIMINARY EXPERIMENTS USING THE ATOM PROBE FIELD ION MICROSCOPE AND TO INVESTIGATE THE DISTRIBUTION OF ALLOYING ELEMENTS IN A COMMERCIAL NICKEL-BASED SUPERALLOY IN THE FULLY HEAT TREATED CONDITION.

A DIALOG* SEARCH FROM THE METADEX DATABASE

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Topic of search: _____

Searcher: _____

Date: _____

The attached report is the result of a search of the METADEX database using the DIALOG Information Retrieval Service.

The METADEX database, produced by the American Society for Metals (ASM) and the Metals Society (London), provides comprehensive coverage of international literature on the science and practice of metallurgy. The database corresponds to the following printed publications: Review of Metal Literature (1966-1967), Metals Abstracts (1968 to the present), Alloys Index (1974 to the present), and Steels Supplement (1983-1984). The Metals Abstracts portion of the file includes references to about 1,200 primary journal sources. Alloys Index provides access to the records through commercial, numerical, and compositional alloy designations; specific metallic systems; and intermetallic compounds found within these systems. Abstracts are included for most records since 1979. In addition to specialized topics (including specific alloy designations, intermetallic compounds, and metallurgical systems), six basic categories of metallurgy are covered: materials, processes, properties, products, forms, and influencing factors.

SAMPLE RECORD

The positions of the key fields are shown in the following sample record.

```
AN      923344  85-560326
TI       Heat Treatment of Single Crystals.
AU        Field, T T ; Chem, O Y ; Geary, A R ; Salkeld, R W;
        Ulion, N E
CS        United Technologies Corp
PN AD     Patent: GB2141137A, UK  18 Apr. 1984
PY        12 Dec. 1984
JA        Journal Announcement: 8503
DT        Document Type: PATENT
AB        Single crystal superalloys with improved mechanical
        and creep properties are produced by heat treatment at
        temperatures just above the incipient melting
        temperature, followed by a holding time at that
        temperature, to permit diffusion and healing of the
        melt damage, prior to quenching. The process may be
        used to reclaim overheated single crystal superalloy
        articles. Details of a particular cycle applied to a
        specific superalloy composition (Ni--10% Cr--5%
        Al--1.5% Ti--4% W-12% Ta--5% Co) are disclosed.
CN DE     Descriptors: Superalloys, Heat treatment; Nickel
        base alloys, Heat treatment; Homogenizing; Diffusion
        annealing; Cooling rate
ES        Alloy Index(Identifier):Ni-10Cr-5Al-1.5Ti-4W-12Ta-5-
CC ID   Co, SP, NI
SH        Section Heading: 56  (THERMAL TREATMENT)
              (Copyright by the American Society for Metals and
                  the Metals Society, 1985.)
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Key to Data Fields

AB	Abstract	ID	Identifier
AD	Application Date	JA	Journal Announcement
AN	ASM Abstract Number	JN	Journal Name
AU	Author	LA	Language
CC	Alloy Class Code	PI	Periodic Index Term
CL	Conference Location	PN	Patent Number
CN	Alloy Class Name	PU	Publisher
CS	Corporate Source	PY	Publication Year
CT	Conference Title	RN	Report Number
CY	Conference Year	SH	Section Heading
DE	Descriptor	SH	Section Heading Code
DT	Document Type	SN	Intl. Standard Book or Serial No.(ISBN or ISSN)
ES	Element Symbol		
GN	Group Number	TI	Title

Data present in record depends on output format requested and type of record.

DIALOG File 32: Metadex - 66-86/Oct (Copr. Am. Soc. Metals)

987215 86-121369
Clusters in Nickel-Based Alloy Catalysts. (Translation).
Popova, I V ; Zhidomirov, G M ; Katsnel'son, A A ; Yastrebov, L I
Russ. J. Phys. Chem., 57, (5), 727-728 May 1983
ISSN: 0036-0244
Journal Announcement: 8610
Document Type: ARTICLE
Language: ENGLISH
See preceding abstract.

987214 86-121368
Clusters in Nickel-Based Alloy Catalysts.
Popova, I V ; Zhidomirov, G M ; Katsnel'son, A A ; Yastrebov, L I
Zh. Fiz. Khim., 57, (5), 1204-1207 May 1983
ISSN: 0044-4537
Journal Announcement: 8610
Document Type: ARTICLE
Language: RUSSIAN
Short-range order in nickel-based alloy catalysts is discussed by a modification of the theory of the pseudo-potential in transition metal alloys. A model of the screening of non-rigid ions is proposed and used to calculate the ordering energy of the alloys, and hence the total energy of metallic Ni. The method can be used to predict the type of cluster formed in alloy catalysts. 7 ref.--AA

985372 86-352042
Platinum Brings Benefits to Superalloys.
Corti, C
Met. Bull. Mon., (185), 47, 49-50 May 1986
ISSN: 0373-4064
Journal Announcement: 8609
Document Type: ARTICLE
Language: ENGLISH
A major study carried out by the Johnson Matthey Technology Centre into the effects of platinum and other platinum group metals (pgm) additions in nickel-based alloys showed that pgm are showing considerable promise as additions to some nickel-based alloys, extending their use at high temperatures in aggresive environments. Based on this technology, a nickel-based alloy, RJM 2012, containing 4.5% platinum has been developed, which has an excellent castability and an outstanding resistance to hot corrosion and oxidation imparted by platinum additions. While platinum and other pgm additions do not cause degradation of the properties through precipitation of embrittling phases, they can indirectly influence the tendency to microstructural instability in complex alloys.--B.N.R.

984352 86-313201
Crack Propagation in Powder Metallurgy Hot Isostatically Pressed Nickel-Based Alloy.
Hertzberg, R W
Lehigh University
Pp 28 5 May 1985
Report No.: AD-A164 587/8/WMS
Journal Announcement: 8609
Document Type: REPORT
Language: ENGLISH
The room temperature threshold fatigue behavior of P/M HIP'd L.C. Astroloy has been examined. Material with grain sizes ranging from 5-50 mu m has been tested to investigate the influence of grain size on the threshold response. In disc compact tension specimens grain size is observed to have little influence on the threshold values; in contrast tests conducted in four point bend specimens exhibit lower threshold values and display a dependence on grain size with larger grain sizes giving higher threshold values. Consideration has also been given to the growth of short cracks under cyclic loading at low stress intensities. The data reveal that under these conditions short cracks propagate at a consistently faster rate than long cracks subject to the same nominal stress intensity. Analytical work has been conducted which suggests that this behavior may be rationalized in terms of a more appropriate driving force for crack extension. Detailed microstructural information has been collected which identifies the major second phase particles present in the alloy. The effect of simple heat treatments on the distribution of these particles has been observed to be negligible.--NTIS

969128 86-540283
Crack Propagation in Powder Metallurgy Hot Isostatically Pressed Nickel-Based Alloy.
Hertzberg, R W
Lehigh University
Pp 33 5 May 1985
Report No.: AD-A158 885/4/WMS
Journal Announcement: 8604
Document Type: REPORT
Language: ENGLISH
The room temp. threshold fatigue behavior of P/M HIP'd L.C. Astroloy has been examined. Material with grain sizes ranging from 5-50 mu m has been tested to investigate the influence of grain size on the threshold response. In disk compact tension specimens, grain size is observed to have little influence on the threshold values; in contrast, tests conducted in four point bend specimens exhibit lower threshold values. Consideration has also been given to the growth of short cracks under cyclic loading at low stress intensities. The data reveal that under these conditions short cracks propagate at a consistently faster rate than long cracks subject to the same nominal stress intensity. Analytical work has been

(cont. next page)

DIALOG File 32: Metadex - 66-86/Oct (Copr. Am. Soc. Metals)

conducted which suggests that this behavior may be rationalized in terms of a more appropriate driving force for crack extension. Detailed microstructural information has been collected which identifies the major second phase particles present in the alloy. The effect of simple heat treatments on the distribution of these particles has been observed to be negligible.--NTIS

966516 86-580282
Corrosion Behavior of Amorphous Nickel Based Alloy Coatings Fabricated by Ion Beam Mixing.
Bhattacharya, R S ; Rai, A K ; Raffoul, C N ; Pronko, P P ; Khobaib, M
12th International Conference on Metallurgical Coatings, Proceedings, Los Angeles, California, USA, 15-19 Apr. 1985
J. Vac. Sci. Technol. A, 3, (6), 2680-2683 Nov.-Dec. 1985
ISSN: 0734-2101
Journal Announcement: 8603
Document Type: ARTICLE
Language: ENGLISH
Amorphous thin films of MoNi, TiNi, MoNiCr, and TiNiCr with thicknesses in the range of 650-1500 A were prepared by high energy (1 MeV) Au exp + and Pt exp + ion beam mixing. The compositions of these films were Mo sub 50 Ni sub 50 , Ti sub 50 Ni sub 50 , Mo sub 35 Ni sub 54 Cr sub 11 , and Ti sub 40 Ni sub 50 Cr sub 10 . Aqueous corrosion behavior of these amorphous films were studied in 1N HNO sub 3 and 0.1N NaCl solutions by the potentiodynamic polarization method. The amorphous coatings showed significantly lower corrosion rates in both acidic and basic aqueous solutions compared with their polycrystalline counterpart which were obtained by annealing the amorphous layers at temp. above the amorphous to crystalline transition temp. The corrosion behavior of amorphous films was also significantly improved in comparison with pure elemental constituents. 13 ref.--AA

961323 86-320080
Thermal Expansion of the Austenitic Stainless Steels and Titanium Alloys in the Temperature Range 5-300K.
Skibina, L V ; Ilichev, V Ya ; Chernik, M M ; Popov, V P
Cryogenics, 25, (1), 31-32 Jan. 1985 ISSN: 0011-2275
Journal Announcement: 8602
Document Type: ARTICLE
Language: ENGLISH
Thermal expansion coefficients were determined in the temperature range 5-300K for an austenitic stainless steel, a nickel based alloy and three titanium alloys. Thermal conductivity and specific heat capacity were also determined and the behaviour of the three functions compared. The thermal expansion was found to be the thermophysical characteristic which was most sensitive to changes in electron magnetic states at low temperatures. 4 ref.--AA

953322 85-581136
Characterization of Plasma-Sprayed Iron- and Nickel-Based Alloy Coatings.
Bhat, H
State University of New York
Diss. Abstr. Int., 45, (4), Pp 372 Oct. 1984
ISSN: 0419-4217
Journal Announcement: 8511
Document Type: ARTICLE
Language: ENGLISH
Iron-based alloy plasma sprayed coatings have been investigated employing Mossbauer spectroscopy and X-ray diffraction to obtain structural information. This provides an insight into the quench rates undergone by the splats and the phases obtained. The extent of alloying occurring during spraying, on starting with a composite Fe--Al--Mo powder has been evaluated. The cavitation--erosion resistance of these alloys have been studied in the light of the structural information. To examine the influence of quench rate (solidification rate) at the substrate, conventional plasma spraying has been modified by spraying onto a Cu substrate held at temp. near liquid nitrogen. Martensitic and austenitic stainless steels and Fe--C alloy compositions were sprayed by this spray-quenching method. Using TEM, the structure of electron transparent regions in the coatings were compared with thicker coatings, obtained by the same procedure. Such structures were correlated with various mechanical properties. (DA8409634).--AA

953155 85-570848
Cavitation Erosion Characteristics of Nickel-Based Alloy--Composite Coatings Obtained by Plasma Spraying.
Mann, B S ; Krishnamoorthy, P R ; Vivekananda, P
Wear, 103, (1), 43-55 1 May 1985 ISSN: 0043-1648
Journal Announcement: 8511
Document Type: ARTICLE
Language: ENGLISH
Nickel-based alloy and composite coatings were obtained on an 18-8 stainless steel substrate by a plasma spraying technique. They were sintered in a vacuum furnace (10 exp --2 Pa) to improve toughness and to reduce hardness. The cavitation erosion resistance of these coatings was evaluated using a rotating disc apparatus. The results of the investigation reveal that sintered coatings are several times better than "as-sprayed" plasma coatings. The sintered coatings can help in increasing the length of the incubation period. 17 ref.--AA

945386 85-551638
Method of Brazing With Nickel Based Alloy.
Bose, D ; Datta, A ; DeCristofaro, N J
Allied Corp
Patent: US4508257 ,USA 28 Feb. 1983
(cont. next page)

DIALOG File 32: Metadex - 66-86/Oct (Copr. Am. Soc. Metals)

Off. Gaz., 2 Apr. 1985 ISSN: 0360-5132
Journal Announcement: 8509
Document Type: PATENT
A process for fabricating homogeneous ductile foil having a composition čonsisting essentially of 25-35 at.% Pd and 15-20 at.% Si, the balance being Ni and incidental impurities comprises forming a melt of the composition and quenching the melt on a moving chill surface at a rate of at least approx 10 exp 5 deg C/s.

943869 85-313740
The Effect of Microalloying With Calcium and Magnesium on the Plasticity of Poldi AKN 20 Nickel-Based Alloy. (Translation: BISI 21774).
Kuncl, F
Hutn. Listy, 37, (6), 398-400 June 1982 ISSN: 0018-8069
Journal Announcement: 8509
Document Type: ARTICLE
Language: ENGLISH
See Met. A. , 8301-31-0065.

940816 85-351382
Intergranular Corrosion Test Method for Nickel-Based Alloy 690.
Yamanaka, K ; Minami, T ; Tokimasa, K ; Nagano, H
J. Jpn. Inst. Met., 49, (2), 125-133 Feb. 1985
ISSN: 0021-4876
Journal Announcement: 8508
Document Type: ARTICLE
Language: JAPANESE
Intergranular corrosion test methods were studied for the purpose of evaluating the degree of sensitization caused by chromium carbide precipitation at the grain boundaries in high Cr--Ni based alloys such as Alloy 690. The results obtained are as follows: the most recommendable intergranular corrosion tests for the evaluation of sensitization in Alloy 690 are the immersion tests in the boiling solution of 65%HNO sub 3 + 0.1%HF or 65%HNO sub 3 + 0.2 kg/m exp 3 Cr(VI) ions. TTS diagram for Alloy 690 obtained from these corrosion test results is characterized by the C-curve in the temp. range between 773 and 1073K. It is also confirmed that the C-curve of TTS diagram shows the same tendency as that of TTP (time--temp.--precipitation of carbide) diagram in Alloy 690. The average Cr concentration at the Cr depleted zone in the Alloy 690 containing 0.025% carbon calculated on the basis of the value of corrosion rates is not < 10% Cr even in the severely sensitized condition. This is the reason why Alloy 690 has high resistance to intergranular corrosion. Reactivation charge obtained by the EPR method in 0.5 kmol/m exp 3 H sub 2 SO sub 4 + 0.01 kmol/m exp 3 KSCN solution at 303K showed a good correlation with corrosion rate in the boiling solution of 65%HNO sub 3 + 0.1%HF. 6 ref.--AA

939066 85-121168
A HREM Study of Domain Structures in the H Phase Coexisting With the Sigma Phase in a Nickel-Based Alloy.
Li, D X ; Ye, H Q ; Kuo, K H
Philos. Mag. A, 50, (4), 531-544 Oct. 1984
ISSN: 0141-8610
Journal Announcement: 8508
Document Type: ARTICLE
Language: ENGLISH
Parallel and rotation domains occur abundantly in the newly discovered H phase, always found coexisting with a sigma phase, of a nickel-based alloy. The domain structures have been studied in detail by means of high resolution electron microscopy. All variants of domain boundary studied are coherent and a narrow band of sigma can always be identified at the boundary as a transition structure between two H domains. This is discussed from the viewpoint of tetrahedral close-packed structures in general and close structural relationship between H and sigma in particular. 6 ref.--AA

895512 84-351662
Role of Alloying Elements on Corrosion Resistant Nickel-Based Alloy for Sour Gas Environment. (Pamphlet).
Murayama, J ; Miyuki, H ; Kudo, T ; Fujino, N ; Terasaki, F
Pp 18
Publ: The Metallurgical Society/AIME, 420 Commonwealth Dr., Warrendale, Pa. 15086, U.S.A., 1984
Report No.: TMS Paper No. A84-45
Journal Announcement: 8407
Document Type: REPORT
Language: ENGLISH
The corrosion resistance of Ni-based alloy Hastelloy C276 is superior to that of Fe-based alloy (SM25, SM2550 and 30Cr--2Mo). The corrosion resistances of Ni-based alloys are improved with increasing Cr and Mo contents. Moreover, the ratio of Cr to Ni (Cr/Ni) in matrix greatly affects the surface film structure. It is essential to form the chromium oxide for improvement of corrosion resistance in H sub 2 S--CO sub 2 --Cl exp -- environments and in neutral chloride environments. On the other hand, Fe-based alloys (e.g. duplex stainless steel) only have excellent corrosion resistance in Cl exp -- -free environment because of the presence of air formed oxide film before corrosion tests. However, corrosion resistance of Fe-based alloys drastically deteriorates by Cl exp -- attack in H sub 2 S environments including higher Cl exp -- concentration. Results on the role of alloying elements on corrosion resistance in H sub 2 S--CO sub 2 --Cl exp -- environments are: Cr is an important element to form the passive film of chromium oxide; Mo suppresses Cl exp -- attack and promotes the formation of chromium oxide film; Ni promotes the formation of chromium oxide film and also the nickel sulfide on Ni-based alloys or lower Cr alloys.--AA

DIALOG File 32: Metadex - 66-86/Oct (Copr. Am. Soc. Metals)

867628 83-460191
Nickel-Based Alloy.
Merrick, H F ; Curwick, L R ; Benn, R C
International Nickel Co
Patent: US4358318 ,USA 13 May 1980
Off. Gaz., 9 Nov. 1982 ISSN: 0360-5132
Journal Announcement: 8311
Document Type: PATENT
An alloy metallurgically stable with respect to the formation of sigma phase when placed under stress at temp. up to approx 1100 deg C and having resistance to the detrimental effects of oxidation and corrosion at high temp. consists essentially of approx 0.2% carbon, approx 11.5-12.2% Cr, approx 4-8% cobalt, approx 4.5-5.2% Mo, plus tungsten with the ratio of Mo to W being approx 1.5%, approx 8.8-9.7% Al plus Ti with the ratio of Al to Ti being approx 0.95%, up to approx 0.4% boron, up to approx 0.1% Zr, balance essentially Ni. The alloy is characterized by a life-to-rupture at 760 deg C under a stress of 648 MPa of approx 100 h and by a life-to-rupture at 980 deg C under a stress of 200 MPa of approx 25 h and is characterized by being devoid of sigma phase after exposure to stress at temp. up to approx 1100 deg C.

864723 83-580981
Protection of Nickel-Based Alloys Against Carburization With Ti--Si-Enriched Layers.
Singheiser, L ; Wahl, G ; Thiele, W
Metallurgical Coatings and Process Technology, San Diego, Calif., 5-8 Apr. 1982
Thin Solid Films, 95, (1), 35-45 3 Sept. 1982
ISSN: 0040-6090
Journal Announcement: 8310
Document Type: ARTICLE
Language: ENGLISH
The possibility of protecting the nickel-based alloy Hastelloy X against carburization using Ti--Si-enriched layers is discussed. The Ti--Si-enriched layers were produced using a chemical vapour deposition reaction. At high carbon activities, kinetic measurements show that the rate of carburization is determined by the diffusion of carbon in a dense adherent TiC layer. An activation energy of --256 kJ/mol was calculated from an Arrhenius plot of the parabolic rate constant k sub p . 9 ref.--AA

851775 83-120997
Stability and Crystallization of an Amorphous Nickel-Based Alloy.
Ozgowicz, W ; Tyrlik-Held, J ; Thomas, G ; Zahra, A ; Coze, J Le
Scr. Metall., 17, (3), 295-298 Mar. 1983 ISSN: 0036-9748
Journal Announcement: 8307
Document Type: ARTICLE
Language: ENGLISH
Amorphous alloys, called metallic glasses, have found considerable attention in fundamental research as materials having potential engineering applications. Rapid cooling of the metallic liquid results in solidification to an amorphous state and a structure which is metastable. It is important to determine the thermal stability of glasses and to control the crystallization behavior. Experiments were undertaken to determine the character of the crystallization process for Ni sub 82 Cr sub 7 Fe sub 3 Si sub 5 B sub 3 , a metallic glass alloy used as brazing filler for joining stainless steels and Ni allloys. 15 ref.--AA

840904 83-110337
Gamma Prime Phase in Directionally Solidified IN738 Alloy. (Abstract Only).
Rosenthal, R ; West, D R F
1982 Modern Metallography in Metallurgy Conference and Exhibition, Cambridge, England, 6-8 Sept. 1982
Paper 40
Publ: The Metals Society, 1 Carlton House Terrace, London SW1Y 5DB, England, 1982
Journal Announcement: 8304
Document Type: BOOK
Language: ENGLISH
See Met. A. , 8302-72-0133. An investigation has been made of the effect of solidification conditions viz solidification rate and temperature gradient on the formation of the gamma ' phase in nickel-based alloy IN738. Solidification rates in the range 10-600 mm/hr have been used with temperature gradients of 13 and 20 deg C/mm. The investigation of the formation of gamma ' and carbide was assisted by the examination of ingots which had been quenched during the directional solidification process, thus preserving the high temperature sequence of phase transformations. Scanning electron microscopy and replica techniques have been used for microstructural examination; also compositional analysis has been carried out, for example, of extracted gamma ' particles using STEM. In the as-solidified state, the alloy contains approximately 0.50 volume fraction of gamma '. The bulk of the gamma ' forms by continuous precipitation in the solid state, generally appearing as approximately cubic shaped particles. Some discontinuous precipitation of gamma ' occurs favoured by low cooling rates in the directional solidification process; the discontinuous cells appear in a 'fan' shape and consist of gamma ' rods with an unusual 'dendritic' morphology. A small amount of gamma -- gamma ' eutectic is also present in the alloy. Studies have been made of the effect of various heat treatments; for example, the coarsening kinetics of gamma ' have been measured in the range 850-1050 deg C. --AA.

817531 82-620221
Nickel-Based Alloy Wire and Urethane Insulation Combine to Improve Heart Pacemaker Leads.
Nickel Top., 35, (1), 5 1982
Journal Announcement: 8208

(cont. next page)

DIALOG File 32: Metadex - 66-86/Oct (Copr. Am. Soc. Metals)

Document Type: ARTICLE
Language: ENGLISH

The use of a Ni--Co alloy MP35N composite in a Ag matrix for lead conductors is improving the over-all performance of cardiac pacemakers. This conductor, SPECTRAFLEX, was designed and developed by Medtronic, Inc. The drawn brazed strand is a special wire designed, developed and patented by Fort Wayne Metals, Inc. When first developed by General Electric in the 1960's, it was a coil comprised of six strands of stainless steel also in a matrix of Ag. Recently, Medtronic replaced the stainless steel with Latrobe Steel's multiphase MP35N, a quarternary alloy of 35% Ni, 35% Co, 20% Cr, 10% Mo. Improvements include: a 50% decrease in the lead body size; a friction coefficient approx 20 times less than silicone rubber; a reduced lead electrical resistance by a factor of ten; a flex life > 5 times that of homogeneous MP35N; and a reoperation rate of < 1%, which is lower than that of any other currently available product.--G.G.M.

795553 82-310564
Fretting at High Temperatures.
Waterhouse, R B
Tribology Int., 14, (4), 203-207 Aug. 1981
ISSN: 0301-679X
Journal Announcement: 8202
Document Type: ARTICLE
Language: ENGLISH

The fretting damage to an austenitic stainless steel, type 321, in CO sub 2 is much reduced at temperatures above 400 deg C by the formation of a glaze type oxide. Increasing the normal pressure from 2 to 6.9 MPa at 650 deg C greatly increased the extent and quality of the glaze. The nickel-based alloy, Inconel 718, developed glaze oxide when fretted at 540 deg C in air, as indicated by a low coefficient of friction and wear rate. At 280 deg C, the glaze was only found at greater amplitudes of slip. Although the titanium alloy Ti--6Al--4V in air at 200 to 400 deg C developed a surface oxide which has some of the superficial features of a glaze, it nevertheless did not reduce the coefficient of friction to values characteristic of glaze. The common feature of high-temperature alloys which develop protective glaze oxides is that they are capable under conditions of sliding and fretting of forming a spinel type oxide which, however, must be adequately supported by a creep-resistant substrate at the operating temperature. 16 ref.--AA

776117 81-620183
The Nickel-Based Alloy Composite Materials Prepared by Hot Isostatic Pressing.
Emmer, S ; Cabelka, D ; Havalda, A
Process Eng. Mag., (11-12), 403-406 Nov.-Dec. 1980
Journal Announcement: 8108
Document Type: ARTICLE
Language: ENGLISH

Nickel-based tungsten fiber-reinforced composite materials were prepared using isostatic hot pressing of metal powders. The material properties of powders, the properties resulting from the powder preparation process and the powder metal characteristics from the point of view of hot pressing application were studied. The following optimum parameters of isostatic pressing of the powders utilized are: T = 1150 deg C, p = 110 MPa, t = 1 h for the preparation of composite materials. Tungsten fibers of 0.2 mm with tensile strength of 2700 MPa were used as reinforcement. The short time strength at room temp. and 40 vol.-% fibers is 1100 MPa, whereas at 1100 deg C it is 150 MPa. The achieved creep strength of Ni --W fiber composite material with 20 vol.-% reinforcing fibers at 700 deg C and 2500 testing hours was 150 MPa and the ductility 11%.--AA

756374 81-720074
Sintering Processes. Materials Science Research Vol. 13.
Fifth International Conference on Sintering and Related Phenomena, Notre Dame, Indiana, U.S.A., 18-21 June, 1979
Pp xi + 575, 17 x 26 cm, illustrated (USdollars U.S. 55.00)
Publ: Plenum Press, New York, U.S.A., 1980
Journal Announcement: 8102
Document Type: BOOK
Language: ENGLISH

Contents include: Y. MASUDA and R. WATANABE, 'Ostwald Ripening Processes in the Sintering of Metal Powders'; T.M. HARE, Statistics of Early Sintering and Rearrangement by Computer Simulation'; D.L. JOHNSON, 'Solid State Sintering Models'; H.E. EXNER and G. PETZOW, 'A Critical Evaluation of Shrinkage Equations'; Z. HARA and K. AKECHI, 'Structure of Sintering Necks in Silver Powder Compacts'; R.L. PORTER, 'The Effects of Surface Topography During the Initial Stage of Sintering'; L. OGBUJI et al., 'Plastic Deformation During the Intermediate Stages of Sintering'; W.S. COBLENZ et al., 'Initial Stage Solid State Sintering Models. A Critical Analysis and Assessment'; R.M. GERMAN, 'Grain Growth Influences on the Sintering Densification of FCC Metals; The Example of Palladium'; D. STEFANOVIC et al., 'Shrinkage Anisotropy Taking Place During Sintering Regarded from Standpoint of Electronic Theory'; R.M. CANNON 'The Effect of Grain Growth and Particle Coarsening on Sintering'; N.M. SBROCKEY and D.L. JOHNSON, 'Influence of Second Phase Particles to Retard Surface Smoothing and Sintering'; W.J. HUPPMANN and G. PETZOW, 'The Elementary Mechanisms of Liquid Phase Sintering'; O.-J. KWON and D.N. YOON, 'The Liquid Phase Sintering of W-Ni'; H. RIEGGER et al., 'Direct Observation of Densification and Grain Growth in a W-Ni Alloy'; D.-Y. KIM and A. ACCARY, 'Mechanisms of Grain Growth Inhibition During Sintering of WC-Co Based Hard Metals', F. THUMMLER, 'Sintering and High Temperature Properties of Si3N4 and SiC'; D.M. MAKOWIECKI and J.B. HOLT, 'Surface Self-Diffusion of Germanium and Silicon'; F.F.Y. WANG et al., 'Hot Pressing of Silicon'; S. BOSKOVIC et al., 'Reaction Sintering of beta -Si3N4 Solid Solution in the System Si, Al/N, O.'; D.R. CLARKE,

(cont. next page)

DIALOG File 32: Metadex - 66-86/Oct (Copr. Am. Soc. Metals)

'Densification of Silicon Nitride Alloys Using a Eutectic Liquid: An Experimental Test'; R.G. LANGE et al., 'Sintering Kinetics of Pure and Doped Boron Carbide'; S. PROCHAZKA and C.F. BOBIK, 'Sintering of Aluminum Nitride'; H. PALMOUR, 'Nonisothermal Sintering and Grain Growth'; M. MITKOV, 'Structure Development During Hot Pressing of a Nickel Based Superalloy APK 1'; A.R. TH*dOLEN, 'Interaction Between Small Particles'; J.T. RICHARDSON et al., 'Sintering Parameters in Ni/SiO2 Catalysts'.

732225 80-210409
Metallographic Development of the Structure of Nickel-Based Alloy.
Meisel, H ; Johner, G ; Sholz, A
Prakt. Metallogr., 17, (6), 261-272 June 1980
Journal Announcement: 8011
Document Type: ARTICLE
Language: ENGLISH AND GERMAN
Two etching techniques for alloy IN100 to reveal the metallographic structure are given to overcome the problems of quality control and rapid failure analysis. The suitability of the two etching processes to macroscopic, microscopic and above all, electron optical examination is described together with a relatively simple preparation technique. The fact that both etching processes have opposite reactions on certain phases of this complex alloy system is particularly useful. The processes described have been used in numerous investigations into the corrosion of Ni-base alloys by hot gases.--AA

705047 80-330407
Kinetic Properties of NR10-VP [Nickel-based] Alloy.
Peletskii, V E ; Sobol', Ya G ; Arskaya, E P
Study and Use of Rhenium Alloys, 98-99 1978
Journal Announcement: 8002
Document Type: ARTICLE
Language: ENGLISH
See Met.A., 7910-72 0320. The resistivity/temp. relationship indicates the presence of two regions of opposite sign of the second derivative of resistivity. Up to 550 deg K it is positive and beyond this it is negative. Alloying of Ni with 10% Re lowers the Curie point by 90 deg K, and the resistivity of the alloy considerably exceeds that of pure Ni. The thermal conductivity of the alloy increases with temp. and is compatible with the Wiedmann-Franz law in the region of solid solution. This enables calculation of the thermal conductivity from resistivity data.--R.A.P.

704431 80-310680
Friction, Wear and Corrosion of Laves-Hardened Nickel Alloy Hardsurfacing in Sodium.
Johnson, R N ; Farwick, D G
Thin Solid Films, 53, (3), 365-373 15 Sept. 1978
ISSN: 0040-6090
Journal Announcement: 8002
Document Type: ARTICLE
Language: ENGLISH
Proc. Fifth Int. Conf. Metallurgical Coatings, San Francisco, Apr. 1978. See Met. A., 7910-72 0305. Results of friction, wear and corrosion tests on Tribaloy 700 specimens are given. The Tribaloy alloys typically consist of a hard intermetallic Laves phase dispersed in a cobalt nickel eutectic or solid solution matrix. Only one alloy of the Tribaloy series, Tribaloy 700, is a cobalt-free nickel-based alloy. Tribaloy 700 is therefore of interest for nuclear reactor applications, where cobalt must be restricted. Tribaloy 700 rubbing against itself in sodium exhibited one of the lowest friction coefficients measured for metallic materials at high temperature. Detonation gun coatings had lower friction and lower corrosion rates than plasma coatings had, in general. The wear rate of Tribaloy 700 negligible. Its surface damage resistance was good, especially for contact with itself or with other hard materials. The material also exhibited low corrosion rates in sodium. 12 ref.--AA

680941 79-312878
The Fretting-Fatigue Behavior of a Nickel-Based Alloy (Inconel 718) at Elevated Temperatures.
Hamdy, M M ; Waterhouse, R B
Wear of Materials, Dearborn, Mich., 16-18 Apr. 1979
351-356
Publ: American Society of Mechanical Engineers, 345 E. 47th St., New York, N.Y. 10017, 1979
Journal Announcement: 7912
Document Type: BOOK
Language: ENGLISH
In many practical applications, such as the gas turbine engine, surfaces of high-temp. corrosion resistant materials are subjected to vibration which results in fretting, a potential hazard to the normally protective oxide film. Fatigue curves have been determined on aged Inconel both with and without fretting at room temp., 280 and 540 deg C in air. A few experiments were conducted at 700 deg C but creep became a contributory factor at this temp. At room temp. and 280 deg C fretting produced a reduction in fatigue strength of > 50% but at 540 deg C the fretting fatigue strength a dramatic rise to very nearly the fatigue strength at room temp. without fretting. This improvement is a result of the increased protection afforded the oxide film at this temp. and its superior wear properties due to the formation of a glaze film.9 refs.--AA

661985 79-460030
Nickel-Based Alloy.
Merrick, H F ; Curwick, L R
International Nickel Co. Inc
Patent: US4127410 ,U.S.A. 24 Mar. 1976
(cont. next page)

DIALOG File 32: Metadex - 66-86/Oct (Copr. Am. Soc. Metals)

Off. Gaz., 28 Nov. 1978
Journal Announcement: 7904
Document Type: PATENT

A Ni-base alloy consists essentially of 11.5-16% Cr, up to 5% metal the group Ta and W and mixtures thereof provided the amount of any W does exceed 3% and further provided the amounts of Cr and any Ta and W are in proportions in accordance with the relationship % Cr + 1/3(% Ta + % 13.5 to 17.5%, 4.3%-5% Al and 4%-5% Ti provided the sum of Al plus Ti is least 8.5, 2-4% Mo, 2% Hf, 10% Co, 0.08-0.2% C, 0.4% B, 0.2% Zr, balance essentially Ni.

656111 79-340058

Oxidation Behaviour of Fecralloy and 20/25/Nb Stainless Steels and a Nickel-Based Alloy, PE16, in Argon Containing 7 mu atm Water Vapour and 375 mu atm Hydrogen.

Bennett, M J ; Houlton, M R
J. Nucl. Mater., 71,(2), 333-344 Jan.1978
Journal Announcement: 7902
Document Type: ARTICLE
Language: ENGLISH

The oxidation behaviour of four alloys [Yt-bearing and Yt-free ferritic stainless steels, a 20Cr--25Ni/Nb-stabilized austenitic stainless steel, and a nimonic alloy, PE16] has been studied in Ar (1.3 atm) 7 mu atm water vapour and 375 mu atm H. The alloys were exposed for periods up to 7166 h at temp. in the range, 650-1000 deg C. The overall reaction kinetics were determined, as were the magnitudes and nature of both the general and any internal attack. The behaviour of the alloys in wet Ar consistent with that observed in fully oxidizing environments, except at the highest temp. studied, 800 and 1000 deg C, with the 20/25/Nb and Fecralloy steels resp. In CO sub 2 a greater attack of both alloys and a more complex composition of the oxide film on the 20/25/Nb steel are attributed to its higher O potential compared with that of the H sub 2O/H gas mixture.

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SAMPLE RECORD

The positions of the key fields are shown in the following sample record.

AN 1662832 A86054845
TI **Possible manifestation of quark-gluon plasma in ultra-relativistic nucleus-nucleus collisions**
AU van Hove, L.
CS Div. of Theor. Phys., CERN, Geneva, Switzerland
JN Nucl. Phys. A (Netherlands) vol.A447 443-53
PY 6 Jan. 1986
CO SN CODEN: NUPABL ISSN: 0375-9474
CT Nucleus-Nucleus Collisions II. Proceedings of the
CY Second International Conference 10-14 June 1985 Visby,
CL Sweden
U. S. Copyright Clearance Center Code: 0375-9474/86/$03.50
TC Treatment: GENERAL,REVIEW; THEORETICAL
DT Document Type: CONFERENCE PAPER
LA Languages: ENGLISH
(23 Refs)
AB The author discusses recent developments concerning possible detection of quark-gluon plasma formation. The topics covered are: early energy and entropy densities; fluctuations; transverse flow; dilepton emission by high temperature plasma; thermalization; plasma formation versus string and chain models.
DE Descriptors: colour model; duality and dual models; elementary particle inclusive interactions; nucleon-nucleon interactions; quark confinement
ID Identifiers: quark-gluon plasma; ultra-relativistic; nucleus-nucleus collisions; early energy; entropy densities; fluctuations; transverse flow; dilepton emission; high temperature plasma
CC Class Codes: A1385K; A1235E; A1240H

Key to Data Fields

AB	Abstract	DE	Descriptor
AN	INSPEC Abstract Number	DT	Document Type
AU	Author	ID	Identifier
CC	Classification Code	JN	Journal Name
CL	Conference Location	LA	Language
CO	CODEN	PY	Publication Year
CS	Corporate Source	SN	International Standard Serial Number (ISSN)
CT	Conference Title	TC	Treatment Code
CY	Conference Year	TI	Title

Data present in record depends on output format requested and type of record.

DIALOG File 13: INSPEC - 77-86/ISS18 (COPR. IEE 1986) See File 12(1969 thru 1976)

1704587 A86082479
Low cycle fatigue propagation of microcracks in two superalloys
Reger, M.; Aria, F.R.; Remy, L.
Centre des Materiaux, Ecole des Mines de Paris, Evry, France
Valluri, S.R.; Taplin, D.M.R.; Rama Rao, P.; Knott, J.F.; Dubey, R. (Editors)
Sponsor: Int. Congress on Fracture
Advances in Fracture Research (Fracture 84). Proceedings of the 6th International Conference on Fracture (ICG6) 1589-95 vol.3 1984
4-10 Dec. 1984 New Delhi, India
Publ: Pergamon, Oxford, England
6 vol. 1+4033 pp. ISBN 0 08 029309 3
Treatment: EXPERIMENTAL
Document Type: CONFERENCE PAPER
Languages: ENGLISH
(12 Refs)
The growth of the dominant microcrack was monitored in low cycle fatigue specimens using a potential drop technique. Two cast superalloys with a fairly large grain size were studied: a moderate strength cobalt-based alloy MAR-M509 at 600 degrees C and a high strength nickel based alloy IN 100 at 1000 degrees C under vacuum. Fatigue crack growth rates results showed a good correlation with cyclic J-integral for the first alloy but are poorly correlated for the second one. A good agreement with data from long cracks in CT specimens was obtained introducing a plastic zone correction equal to the grain size.

1691349 A86077445
Investigations on the mechanical behaviour of the high-temperature alloy NiCr 22 Co 12 Mo
Breuer, H.J.; te Heesen, E.; Huthmann, H.; Meurer, H.P.
Materialpruefung (Germany) vol.28, no.4 101-4 April 1986
CODEN: MTPRAJ ISSN: 0025-5300
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: German
(7 Refs)
Extensive mechanical testing has been carried out to qualify the nickel based alloy NiCr 22 Co 12 Mo (Inconel 617) for use in advanced high temperature reactors at temperatures up to 1000 degrees C. Tensile, impact, internal pressure, fatigue and fracture mechanics tests are reported. Emphasis is placed on the special requirements for high temperature testing techniques taking into account material behaviour at these temperatures. Some of the important results obtained are discussed.

1612518 A86028782
Obtaining a very fine grain structure in a nickel-based alloy
Aubert, H.
CEA, CENS, Gif-sur-Yvette, France
Scr. Metall. (USA) vol.19, no.11 1335-9 Nov. 1985
CODEN: SCRMBU ISSN: 0036-9748
U. S. Copyright Clearance Center Code: 0036-9748/85/$3.00+.00
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: French
(8 Refs)
Fine grain structure, with grains of about 2 mu m diameter, of Inconel 718 during hardening can be obtained by applying mechanical deformation during tempering at temperatures up to 650 degrees C. The structure is stable for 1300 hours creep at this temperature. Compared to the conventional hardening process of this alloy, creep is enhanced.

1609781 A86026992
Compression studies of a nickel-based superalloy, MAR-M200, and of Ni/sub 3/Al
Mauer, F.A.; Munro, R.G.; Piermarini, G.J.; Block, S.; Dandekar, D.P.
Center for Mater. Sci., NBS, Gaithersburg, MD, USA
J. Appl. Phys. (USA) vol.58, no.10 3727-30 15 Nov. 1985
CODEN: JAPIAU ISSN: 0021-8979
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: ENGLISH
(13 Refs)
The lattice parameter of a cubic nickel-based alloy, MAR-M200, has been determined as a function of pressure for $0<p<14$ GPa at room temperature. A similar study was made for Ni/sub 3/Al in the range $0<p<11$ GPa at room temperature. In both cases, the diamond anvil pressure cell was used in conjunction with the energy dispersive method of X-ray diffraction. The data were analyzed in the context of model equations of state and in comparison with other results from ultrasonic studies.

1555808 A85121742
Cavitation erosion characteristics of nickel-based alloy-composite coatings obtained by plasma spraying
Mann, B.S.; Krishnamoorthy, P.R.; Vivekananda, P.
Div. of Corp. Res. & Dev., Bharat Heavy Electr. Ltd., Hyderabad, India
Wear (Switzerland) vol.103, no.1 43-55 1 May 1985
CODEN: WEARCJ ISSN: 0043-1648
U. S. Copyright Clearance Center Code: 0043-1648/85/$3.30
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: ENGLISH
(17 Refs)
Nickel-based alloy and composite coatings were obtained on an 18-8 stainless steel substrate by a plasma spraying technique. They were sintered in a vacuum furnace (10/sup -2/

(cont. next page)

Pa) to improve toughness and to reduce hardness. The cavitation erosion resistance of these coatings was evaluated using a rotating disc apparatus. The results of the investigation reveal that sintered coatings are several times better than 'as-sprayed' plasma coatings. The sintered coatings can help in increasing the length of the incubation period.

1447998 A85056383
INTERGRANULAR CORROSION TEST METHOD FOR NICKEL-BASED ALLOY 690
YAMANAKA, K.; MINAMI, T.; TOKIMASA, K.; NAGANO, H.
CENTRAL RES. LABS., SUMITOMO METAL IND. LTD., AMAGASAKI, JAPAN
J. JPN. INST. MET. (JAPAN) VOL.49, NO.2 125-33 FEB. 1985
CODEN: NIKGAV ISSN: 0021-4876
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: JAPANESE
(6 Refs)
INTERGRANULAR CORROSION TEST METHODS WERE STUDIED FOR THE PURPOSE OF EVALUATING THE DEGREE OF SENSITIZATION CAUSED BY CHROMIUM CARBIDE PRECIPITATION AT THE GRAIN BOUNDARIES IN HIGH CHROMIUM-NICKEL BASED ALLOYS SUCH AS ALLOY 690. THE MOST RECOMMENDABLE INTERGRANULAR CORROSION TESTS FOR THE EVALUATION OF SENSITIZATION IN ALLOY 690 ARE THE IMMERSION TESTS IN THE BOILING SOLUTION OF 65PERCENT HNO/SUB 3/+0.1PERCENT HF OR 65PERCENT HNO/SUB 3/+0.2 KG/M/SUP 3/ CR (VI) IONS. TTS DIAGRAM FOR ALLOY 690 OBTAINED FROM THESE CORROSION TEST RESULTS IS CHARACTERIZED BY THE C-CURVE IN THE TEMPERATURE RANGE BETWEEN 773 AND 1073K. THE AVERAGE CHROMIUM CONCENTRATION AT THE CHROMIUM DEPLETED ZONE IN THE ALLOY 690 CONTAINING 0.025PERCENT C CALCULATED ON THE BASIS OF THE VALUE OF CORROSION RATES IS NOT LESS THAN 10PERCENT CR EVEN IN THE SEVERELY SENSITIZED CONDITION.

1428975 A85043868
THERMAL EXPANSION OF THE AUSTENITIC STAINLESS STEELS AND TITANIUM ALLOYS IN THE TEMPERATURE RANGE 5-300K
SKIBINA, L.V.; ILICHEV, V.YA.; CHERNIK, M.M.; POPOV, V.P.
PHYS.-TECH. INST. OF LOW TEMP., ACAD. OF SCI., KHARKOV, UKRAINIAN SSR
CRYOGENICS (GB) VOL.25, NO.1 31-2 JAN. 1985
CODEN: CRYOAX ISSN: 0011-2275
U. S. Copyright Clearance Center Code: 0011-2275/85/010031-02$03.00
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: ENGLISH
(4 Refs)
THERMAL EXPANSION COEFFICIENTS WERE DETERMINED IN THE TEMPERATURE RANGE 5-300K FOR AN AUSTENITIC STAINLESS STEEL, A NICKEL BASED ALLOY AND THREE TITANIUM ALLOYS. THERMAL CONDUCTIVITY AND SPECIFIC HEAT CAPACITY WERE ALSO DETERMINED AND THE BEHAVIOUR OF THE THREE FUNCTIONS COMPARED. THE THERMAL EXPANSION WAS FOUND TO BE THE THERMOPHYSICAL CHARACTERISTIC WHICH WAS MOST SENSITIVE TO CHANGES IN ELECTRON MAGNETIC STATES AT LOW TEMPERATURES.

1387800 A85016942
A HREM STUDY OF DOMAIN STRUCTURES IN THE H PHASE COEXISTING WITH THE ALPHA PHASE IN A NICKEL-BASED ALLOY
LI, D.X.; YE, H.Q.; KUO, K.H.
INST. OF METAL RES., ACAD. SINICA, SHENYANG, CHINA
PHILOS. MAG. A (GB) VOL.50, NO.4 531-44 OCT. 1984
CODEN: PMAADG ISSN: 0141-8610
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: ENGLISH
(6 Refs)
PARALLEL AND ROTATION DOMAINS OCCUR ABUNDANTLY IN THE NEWLY DISCOVERED H PHASE, ALWAYS FOUND COEXISTING WITH A SIGMA PHASE, OF A NICKEL-BASED ALLOY. THE DOMAIN STRUCTURES HAVE BEEN STUDIED IN DETAIL BY MEANS OF HIGH RESOLUTION ELECTRON MICROSCOPY. ALL VARIANTS OF DOMAIN BOUNDARY STUDIED ARE COHERENT AND A NARROW BAND OF SIGMA CAN ALWAYS BE IDENTIFIED AT THE BOUNDARY AS A TRANSITION STRUCTURE BETWEEN TWO H DOMAINS. THIS IS DISCUSSED FROM THE VIEWPOINT OF TETRAHEDRAL CLOSE-PACKED STRUCTURES IN GENERAL AND CLOSE STRUCTURAL RELATIONSHIP BETWEEN H AND SIGMA IN PARTICULAR.

1277240 A84072028
QUANTITATIVE X-RAY ENERGY DISPERSIVE ANALYSIS OF THIN FOILS
VOICE, W.E.; FAULKNER, R.G.
DEPT. OF MATERIALS ENGNG. AND DESIGN, LOUGHBOROUGH UNIV. OF TECHNOL., LOUGHBOROUGH, ENGLAND
J. PHYS. COLLOQ. (FRANCE) VOL.45, NO.C-2 401-5 FEB. 1984
CODEN: JPQCAK ISSN: 0449-1947
10TH INTERNATIONAL CONFERENCE ON THE OPTICS OF X-RAYS AND MICROANALYSIS 5-9 SEPT. 1983 TOULOUSE, FRANCE
Treatment: PRACTICAL; THEORETICAL
Document Type: CONFERENCE PAPER
Languages: ENGLISH
(14 Refs)
A PROCEDURE FOR MAKING QUANTITATIVE X-RAY ANALYSIS OF THIN FOILS IN SCANNING TRANSMISSION ELECTRON MICROSCOPES (STEM) IS DESCRIBED. THE TECHNIQUE PREDICTS CORRECTION PARAMETERS BASED ON THE THICKNESS OF THE FOIL, THE SPECIMEN GEOMETRY AND ELECTRON MICROSCOPE INSTRUMENTAL VARIABLES. ABSORPTION CAN PLAY AN IMPORTANT ROLE IN NICKEL BASED ALLOY SPECIMENS EVEN AT FOIL THICKNESSES OF AROUND 1000 AA.

1068268 A83063266
STABILITY AND CRYSTALLIZATION OF AN AMORPHOUS NICKEL-BASED ALLOY
OZGOWICZ, W.; TYRLIK-HELD, J.; THOMAS, G.; ZAHRA, A.; LE COZE, J.

(cont. next page)

DIALOG File 13: INSPEC - 77-86/ISS18 (COPR. IEE 1986) See File 12(1969 thru 1976)

INST. DE METALL. PHYS. ET SOUDAGE, ECOLE POLYTECH. SILESIENNE, GLIWICE, POLAND;
SCR. METALL. (USA) VOL.17, NO.3 295-8 MARCH 1983
CODEN: SCRMBU ISSN: 0036-9748
U. S. Copyright Clearance Center Code: 0036-9748/83/030295-04$03.00/0
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: ENGLISH
(15 Refs)
RIBBONS OF THE AMORPHOUS NI-BASE ALLOY NI/SUB 82/CR/SUB 7/FE/SUB 3/SI/SUB 5/B/SUB 3/ WERE PRODUCED BY THE CHILL-BLOCK MELT SPINNING METHOD. DIFFERENTIAL SCANNING CALORIMETRY IN THE TEMPERATURE RANGE 20-600 DEGREESC AND X-RAY DIFFRACTION IN THE RANGE 20-800 DEGREESC WERE USED TO STUDY THE CRYSTALLISATION STAGES. STAGE I, 20 DEGREESC<T<450 DEGREESC, WAS SHORT RANGE ORDER REARRANGEMENT OF THE GLASS SOLUTION. STAGE II, T>450 DEGREESC, WAS CRYSTALLISATION OF THE SOLID SOLUTION ALPHA FROM THE GLASS BETA. THE GLASS TRANSITION (TG) OCCURS AT =450 DEGREESC. STAGE III, T=550 DEGREESC, WAS CRYSTALLISATION OF NI/SUB 2/B FROM BETA. STAGE IV, 550 DEGREES<T<800 DEGREESC, WAS THE APPEARANCE OF NEW, NOT WELL DEFINED, PHASES, NI/SUB 3/SI/SUB 2/, FE/SUB 4.5/NI/SUB 18.5/B/SUB 6/ AND FE/SUB 3/SIB.

972041 A83004208
THE USE OF SILICON-ENRICHED LAYERS AS A PROTECTION AGAINST CARBURIZATION IN HIGH TEMPERATURE GAS-COOLED REACTORS
WAHL, G.; SCHMADERER, F.; THIELE, W.
BROWN BOVERI RES. CENTRE, HEIDELBERG, GERMANY
THIN SOLID FILMS (SWITZERLAND) VOL.94, NO.3 257-68 20 AUG. 1982
CODEN: THSFAP
Treatment: APPLIC; PRACTICAL; EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: ENGLISH
(20 Refs)
THE POSSIBILITIES OF PROTECTING THE NICKEL-BASED ALLOY HASTELLOY X USING SILICON-ENRICHED LAYERS ARE DISCUSSED. THE SILICON-ENRICHED LAYERS ARE PRODUCED USING THE CHEMICAL VAPOUR DEPOSITION REACTION SICL/SUB 4/+2H/SUB 2/=SI+4HCL AT 1100 DEGREESC. THE CORRELATION BETWEEN THE DEPOSITION PARAMETERS AND THE LAYER STRUCTURE IS DEFINED. GRAVIMETRIC CARBURIZATION MEASUREMENTS CAN BE DESCRIBED VERY WELL USING A MATHEMATICAL CARBURIZATION MODEL.

967478 A82116619
PROTECTION OF NICKEL-BASED ALLOYS AGAINST CARBURIZATION WITH TI-SI-ENRICHED LAYERS
SINGHEISER, L.; WAHL, G.; THIELE, W.
BROWN BOVERI AND CIE, HEIDELBERG, GERMANY
THIN SOLID FILMS (SWITZERLAND) VOL.95, NO.1 35-45 3 SEPT. 1982
CODEN: THSFAP
NINTH INTERNATIONAL CONFERENCE ON METALLURGICAL COATINGS AND PROCESS TECHNOLOGY 5-8 APRIL 1982 SAN DIEGO, CA, USA
Treatment: EXPERIMENTAL
Document Type: CONFERENCE PAPER
Languages: ENGLISH
(9 Refs)
THE POSSIBILITY OF PROTECTING THE NICKEL-BASED ALLOY HASTELLOY X AGAINST CARBURIZATION USING TI-SI-ENRICHED LAYERS IS DISCUSSED. THE TI-SI-ENRICHED LAYERS WERE PRODUCED USING THE CHEMICAL VAPOUR DEPOSITION REACTION XTICL/SUB 4/+YSICL/SUB 4/+2(X+Y)H/SUB 2/=4(X+Y)HCL+TI-SI-ENRICHED LAYER. AT HIGH CARBON ACTIVITIES, KINETIC MEASUREMENTS SHOW THAT THE RATE OF CARBURIZATION IS DETERMINED BY THE DIFFUSION OF CARBON IN A DENSE ADHERENT TIC LAYER. AN ACTIVATION ENERGY OF -256 KJ MOL/SUP -1/ WAS CALCULATED FROM AN ARRHENIUS PLOT OF THE PARABOLIC RATE CONSTANT K/SUB P/.

901852 A82077661
COMPARATIVE EROSION YIELDS, TOPOLOGRAPHICAL CHANGES AND DEPTH PROFILE ANALYSIS OF ION ERODED NICKEL-BASED ALLOYS
NAVINSEK, B.; PANJAN, P.; PETERNEL, M.; ZABKAR, A.
J. STEFAN INST., 'E. KARDELJ' UNIV. OF LJUBLJANA, LJUBLJANA, YUGOSLAVIA
NUCL. INSTRUM. AND METHODS PHYS. RES. (NETHERLANDS) VOL.194, NO.1-3 621-4 15 MARCH 1982
CODEN: NIMRD9
PROCEEDINGS OF THE NINTH INTERNATIONAL CONFERENCE ON ATOMIC COLLISIONS IN SOLIDS (ICACS) 6-10 JULY 1981 LYON, FRANCE
Treatment: EXPERIMENTAL
Document Type: CONFERENCE PAPER
Languages: ENGLISH
(11 Refs)
POLISHED POLYCRYSTALLINE ALLOY TARGETS OF INCONEL 600, INCONEL 625 AND NIMONIC ALLOY PE 16 WERE BOMBARDED WITH 10 KEV HE/SUP +/ AND AR/SUP +/ IONS AT NORMAL INCIDENCE AND AT ROOM TEMPERATURE. COMPARATIVE STUDIES OF THE ION EROSION YIELD, AS MEASURED BY STEP-HEIGHT MEASUREMENTS, WERE MADE. THE CORRELATION BETWEEN THE OBSERVED TOPOGRAPHY AND THE CHANGES IN SURFACE COMPOSITION AND DEPTH PROFILE WAS STUDIED ON IRRADIATED SAMPLES BY AES. ADDITIONALLY, TOTAL SPUTTERING YIELDS WERE MEASURED ON SPUTTERED FILMS OF THESE MATERIALS USING A QUARTZ CRYSTAL MICROBALANCE. THE RESULTS SHOWED THAT ION EROSION YIELDS ARE DIFFERENT FOR THE THREE MATERIALS STUDIED, WHILE SPUTTERING YIELDS WERE SIMILAR FOR HE/SUP +/ IONS AND DIFFERENT FOR AR/SUP +/ IONS. A NON-LINEAR EFFECT WAS OBSERVED FOR LOW DOSE YIELDS WHEN ION DOSE AND FLUENCE DEPENDENCE WAS STUDIED. THE TOPOGRAPHY OF ION IRRADIATED NICKEL-BASED ALLOYS IS SPECIFIC FOR A CHOSEN METALLOGRAPHIC TREATMENT, DETERMINING THE BULK AND SURFACE STRUCTURE OF THE TARGET MATERIAL.

831620 A82029344
PROTECTION AGAINST CARBURIZATION IN HIGH TEMPERATURE GAS-COOLED REACTORS WITH SILICON-ENRICHED LAYERS
WAHL, G.; SCHMADERER, F.

(cont. next page)

DIALOG File 13: INSPEC - 77-86/ISS18 (COPR. IEE 1986) See File 12(1969 thru 1976)

ZENTRALES FORSCHUNGSLAB., BROWN, BOVERI AND CIE AG, HEIDELBERG, GERMANY
THIN SOLID FILMS (SWITZERLAND) VOL.84, NO.1 127-8 2 OCT. 1981
CODEN: THSFAP
INTERNATIONAL CONFERENCE ON METALLURGICAL COATINGS 6-10 APRIL 1981 SAN FRANCISCO, CA, USA
Treatment: EXPERIMENTAL
Document Type: CONFERENCE PAPER
Languages: ENGLISH
SUMMARY FORM ONLY GIVEN. CREEP AND CORROSION TESTS IN HIGH TEMPERATURE GAS-COOLED REACTOR HELIUM CONTAINING CARBURIZING IMPURITIES HAVE SHOWN THAT ALL CURRENT CANDIDATE MATERIALS FROM PRIMARY CIRCUIT COMPONENTS ARE AFFECTED BY CARBURIZATION AND OXIDATION. THE CHANGE IN THE PROPERTIES OF THE MATERIALS IS CAUSED MAINLY BY CARBIDE FORMATION. THE PURPOSE OF THE LAYERS IS TO PREVENT CARBIDE FORMATION. THE POSSIBILITIES OF PROTECTING THE NICKEL-BASED ALLOY HASTELLOY X USING SILICON ENRICHED LAYERS ARE DISCUSSED. THE CORRELATION BETWEEN THE DEPOSITION PARAMETERS AND THE LAYER STRUCTURE IS DISCUSSED AND THE OPTIMAL DEPOSITION PARAMETERS ARE DEFINED. FOR THE INVESTIGATIONS, LAYERS ARE USED IN WHICH SILICON IS MAINLY SOLUTED, IN ORDER TO PREVENT THE FORMATION OF THE BRITTLE SILICIDE PHASES. THE LAYER THICKNESSES WERE VARIED BETWEEN 50 AND 200 MUM. THE PROTECTION PROPERTIES OF THESE LAYERS WERE INVESTIGATED IN SHORT-TERM EXPERIMENTS (UP TO ABOUT 100 H) IN CH/SUB 4/-H/SUB 2/ ATMOSPHERES WITH CARBON ACTIVITIES A/SUB C/ OF 0.2 AT THE TEMPERATURES T OF 850-1000 DEGREESC. THE CARBURIZATION WAS MEASURED BY TWO METHODS: (1) USING METALLOGRAPHICAL INVESTIGATIONS (DETERMINATION OF THE THICKNESS OF THE CARBURIZED ZONE AND DETERMINATION OF THE COMPOSITION OF THE CARBIDES BY MICROPROBE ANALYSIS); (2) DETERMINING THE WEIGHT GAIN OF THE SAMPLE DUE TO CARBON CONSUMPTION, USING A MICROBALANCE, DURING THE CARBURIZATION EXPERIMENTS.

817841 A82022335
FRETTING AT HIGH TEMPERATURES
WATERHOUSE, R.B.
DEPT. OF METALL. AND MATERIALS SCI., UNIV. OF NOTTINGHAM, NOTTINGHAM, ENGLAND
TRIBOLOGY INT. (GB) VOL.14, NO.4 203-7 AUG. 1981
CODEN: TRBIBK
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: ENGLISH
(16 Refs)
THE FRETTING DAMAGE TO AN AUSTENITIC STAINLESS STEEL, TYPE 321, IN CO/SUB 2/ IS MUCH REDUCED AT TEMPERATURES ABOVE 400 DEGREESC BY THE FORMATION OF A GLAZE TYPE OXIDE. INCREASING THE NORMAL PRESSURE FROM 2 TO 6.9 MN M/SUP -2/ AT 650 DEGREESC GREATLY INCREASED THE EXTENT AND QUALITY OF THE GLAZE. THE NICKEL-BASED ALLOY, INCONEL 718, DEVELOPED GLAZE OXIDE WHEN FRETTED AT 540 DEGREESC IN AIR, AS INDICATED BY A LOW COEFFICIENT OF FRICTION AND WEAR RATE. AT 280 DEGREESC, THE GLAZE WAS ONLY FOUND AT GREATER AMPLITUDES OF SLIP. ALTHOUGH THE TITANIUM ALLOY TI-6AL-4V IN AIR AT 200 TO 400 DEGREESC DEVELOPED A SURFACE OXIDE WHICH HAD SOME OF THE SUPERFICIAL FEATURES OF A GLAZE, IT NEVERTHELESS DID NOT REDUCE THE COEFFICIENT OF FRICTION TO VALUES CHARACTERISTIC OF GLAZE. THE COMMON FEATURE OF HIGH-TEMPERATURE ALLOYS WHICH DEVELOP PROTECTIVE GLAZE OXIDES IS THAT THEY ARE CAPABLE UNDER CONDITIONS OF SLIDING AND FRETTING OF FORMING A SPINEL TYPE OXIDE WHICH, HOWEVER, MUST BE ADEQUATELY SUPPORTED BY A CREEP-RESISTANT SUBSTRATE AT THE OPERATING TEMPERATURE.

743556 A81082060
DIFFUSION PARAMETERS OF THE GAMMA/GAMMA MINUTES PHASE BOUNDARY IN A NICKEL-BASED ALLOY
BOKSHTEIN, S.Z.; BOLBEROVA, E.V.; KISHKIN, S.T.; KULESHOVA, E.A.; LOGUNOV, A.V.; MISHIN, YU.M.; RAZUMOVSKII, I.M.
DOKL. AKAD. NAUK SSSR VOL.253, NO.4-6 1377-80 AUG. 1980
CODEN: DANKAS
Trans in: SOV. PHYS.-DOKL. (USA) VOL.25, NO.8 646-8 AUG. 1980
CODEN: SPHDA9
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: ENGLISH
(4 Refs)
THE AUTHORS MEASURE THE DIFFUSION COEFFICIENTS D/SUB P.B./ OF THE RADIOACTIVE ISOTOPE /SUP 63/NI IN GAMMA/GAMMA MINUTES PHASE BOUNDARIES IN A NICKEL ALLOY OF THE ZHS FAMILY. IN THIS ALLOY IN THE COURSE OF CRYSTALLIZATION ABOUT 30 VOL.PERCENT OF THE EUTECTIC GAMMA MINUTES PHASE, WHICH THEY CALL THE PRIMARY PHASE, IS FORMED; UPON COOLING TO ROOM TEMPERATURES THEY OBSERVE DECOMPOSITION OF THE SOLID SOLUTION WITH PRECIPITATION OF THE SECONDARY GAMMA MINUTES PHASE. THE OBJECT OF THEIR STUDY WAS THE PHASE BOUNDARY BETWEEN THE PRIMARY GAMMA MINUTES PHASE AND THE MATRIX.

724599 A81070327
THE NICKEL-BASED ALLOY COMPOSITE MATERIALS PREPARED BY HOT-ISOSTATIC PRESSING
EMMER, S.; CABELKA, D.; HAVALDA, A.
PROCESS ENG. (GERMANY) NO.11-12 403-6 1980
CODEN: PROEDV
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: ENGLISH
(2 Refs)
DESCRIBES SOME WORK ON THE PREPARATION OF NICKEL BASED TUNGSTEN FIBRE REINFORCED COMPOSITE MATERIALS USING METAL POWDER ISOSTATIC HOT PRESSINGS. RESULTS OF THE WORK ARE PRESENTED.

DIALOG File 13: INSPEC - 77-86/ISS18 (COPR. IEE 1986) See File 12(1969 thru 1976)

657704 A81026594
INTERGRANULAR EMBRITTLEMENT CAUSED BY THE PRECIPITATION OF M/SUB 6/C CARBIDE CONTAINING SILICON
GUAN, X.M.; YE, H.Q.
INST. OF METAL RES., ACAD. SINICA, SHENYANG, CHINA
J. MATER. SCI. (GB) VOL.15, NO.11 2935-7 NOV. 1980
CODEN: JMTSAS
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: ENGLISH
(3 Refs)
IT WAS FOUND THAT A NICKEL BASED ALLOY (NISI/SUB 0.2/)/SUB 3/(MO/SUB 0.25/W/SUB 0.15/CR/SUB 0.4/)/SUB 3/ C BECOMES EMBRITTLED WHEN THE SILICON CONTENT APPROACHES ITS UPPER LIMIT. THEREFORE A SERIES OF ALLOYS WITH SILICON CONTENTS VARYING FROM 0.22 TO 1.49 WT.PERCENT WERE PREPARED. AFTER QUENCHING FIRST FROM 1190 DEGREESC AND THEN FROM 1050 DEGREESC, THESE ALLOYS WERE AGED AT 800 DEGREESC FOR 16 H. THE ABRUPT DEGRADATION IN THE IMPACT PROPERTY AT 0.4-0.6 WT.PERCENT SI AND ITS SUBSEQUENT RECOVERY AT A SILICON CONTENT ABOVE 0.7 WT.PERCENT WAS CONSIDERED TO BE SOMEWHAT ABNORMAL AND THEREFORE A THOROUGH METALLOGRAPHIC EXAMINATION WAS CARRIED OUT IN ORDER TO CLARIFY THE BEHAVIOUR OF SILICON IN THIS TYPE OF ALLOY.

533740 A80061467
ENHANCEMENT OF LOW GRADE HEAT VIA THE HYCSOS CHEMICAL HEAT PUMP
GRUEN, D.M.; SHEFT, I.; LAMICH, G.J.
CHEM. DIV., ARGONNE NAT. LAB., ARGONNE, IL, USA
VEZIROGLU, T.N. (Editors)
2ND MIAMI INTERNATIONAL CONFERENCE ON ALTERNATIVE ENERGY SOURCES, PROCEEDINGS OF CONDENSED PAPERS 301-2 1979
10-13 DEC. 1979 MIAMI BEACH, FL, USA
Publ: CLEAN ENERGY RES. INST., CORAL GABLES, FL, USA
LII+807 pp.
Treatment: GENERAL,REVIEW
Document Type: CONFERENCE PAPER
Languages: ENGLISH
(8 Refs)
THE HYCSOS SYSTEM IS A THERMALLY DRIVEN CHEMICAL HEAT PUMP BASED ON TWO METAL HYDRIDES WITH DIFFERENT FREE ENERGIES OF FORMATION THAT FUNCTIONS IN HEATING, COOLING AND ENERGY CONVERSION MODES. AN INTERESTING MODE OF HYCSOS OPERATION IS MADE FEASIBLE BY THE RECENT DEVELOPMENT OF A SERIES OF TERNARY ALLOYS WHOSE HYDROGEN DECOMPOSITION PRESSURES AT A GIVEN TEMPERATURE CAN BE VARIED BY SEVERAL ORDERS OF MAGNITUDE BY SUBSTITUTION OF GROUP III A OR IV A ELEMENTS FOR NI. IN PARTICULAR, THE SUBSTITUTION OF ALUMINUM FOR ONE NICKEL ATOM IN THE LANI/SUB 5/ CLASS OF ALLOYS REDUCES THE DISSOCIATION PRESSURE AT ROOM TEMPERATURE FROM APPROXIMATELY 2 ATMOSPHERES TO ABOUT 10/SUP -3/ ATMOSPHERES. MEASUREMENTS ON WELL ANNEALED SAMPLES SHOW ENTROPY CHANGES OVER A WIDE COMPOSITION RANGE TO BE VIRTUALLY CONSTANT. SIMILAR SUBSTITUTION OF ALUMINUM FOR NICKEL IN MISHMETAL NICKEL ALLOY SUBSTANTIALLY REDUCES THE UNACCEPTABLY HIGH HYSTERESIS AND PERMITS THE USE OF THIS MUCH LESS EXPENSIVE MATERIAL.

331849 A79028254
MICROSTRUCTURAL EFFECTS IN SPUTTERED MULTIPHASE ALLOY DEPOSITS
BEALE, H.A.; HECHT, R.J.; HOLIDAY, P.R.; MULLALY, J.R.; THOMPSON, E.; TORREY, C.T.
PRATT AND WHITNEY AIRCRAFT, JUPITER, FL, USA
THIN SOLID FILMS (SWITZERLAND) VOL.54, NO.3 326 1 NOV. 1978
CODEN: THSFAP
INTERNATIONAL CONFERENCE ON METALLURGICAL COATINGS 3-7 APRIL 1978 SAN FRANCISCO, CA, USA
Treatment: EXPERIMENTAL
Document Type: CONFERENCE PAPER
Languages: ENGLISH
SUMMARY FORM ONLY GIVEN, SUBSTANTIALLY AS FOLLOWS. THE SYNTHESIS OF METASTABLE ALLOY AND/OR METALLURGICAL STRUCTURES WITH SUBSEQUENT CONTROLLED PROCESSING IS CONSIDERED TO BE ONE OF THE MOST PROMISING NEW AREAS OF MATERIALS RESEARCH. EFFORTS ARE PRESENTLY BEING MADE TO EXAMINE THE POTENTIAL USE OF SUCH METALLURGICAL STRUCTURES FOR AEROSPACE APPLICATIONS. RESULTS ARE PRESENTED FOR THREE ALLOY SYSTEMS OF INTEREST: FE-NI-TIB/SUB 2/, A DISPERSION-STRENGTHENED IRON-BASED ALLOY; NI-CR-AL-TIC, A DISPERSION-STRENGTHENED NICKEL-BASED ALLOY: COTAC III, A EUTECTIC SUPERALLOY. GRAIN SIZES, PRECIPITAATE SIZES AND MECHANICAL PROPERTIES ARE REPORTED AS FUNCTIONS OF THE POST-COATING TREATMENTS.

322404 A79024628
FRICTION, WEAR AND CORROSION OF LAVES-HARDENED NICKEL ALLOY HARDSURFACING IN SODIUM
JOHNSON, R.N.; FARWICK, D.G.
HANFORD ENGNG. DEV. LAB., RICHLAND, WA, USA
THIN SOLID FILMS (SWITZERLAND) VOL.53, NO.3 365-73 15 SEPT. 1978
CODEN: THSFAP
INTERNATIONAL CONFERENCE ON METALLURGICAL COATINGS 3-7 APRIL 1978 SAN FRANCISCO, CA, USA
Treatment: EXPERIMENTAL
Document Type: CONFERENCE PAPER
Languages: ENGLISH
(12 Refs)
GIVES THE RESULTS OF FRICTION WEAR AND CORROSION TESTS ON TRIBALOY 700 SPECIMENS. THE TRIBALOY ALLOYS ARE A FAMILY OF MATERIALS TYPICALLY CONSISTING OF A HARD INTERMETALLIC LAVES PHASE DISPERSED IN A COBALT OR NICKEL EUTECTIC OR SOLID SOLUTION MATRIX. ONLY ONE ALLOY OF THE TRIBALLOY SERIES, TRIBALOY 700, IS A COBALT-FREE NICKEL-BASED ALLOY. TRIBALOY 700 IS THEREFORE OF INTEREST FOR NUCLEAR REACTOR APPLICATIONS, WHERE COBALT MUST BE RESTRICTED. TRIBALOY 700 RUBBING AGAINST ITSELF IN SODIUM EXHIBITED ONE OF THE LOWEST FRICTION COEFFICIENTS MEASURED FOR METALLIC MATERIALS AT HIGH TEMPERATURE. DETONATION GUN COATINGS HAD LOWER FRICTION AND LOWER CORROSION RATES THAN PLASMA COATINGS HAD, IN GENERAL. THE WEAR RATE OF TRIBALOY 700 WAS NEGLIGIBLE. ITS SURFACE

(cont. next page)

DIALOG File 13: INSPEC - 77-86/ISS18 (COPR. IEE 1986) See File 12(1969 thru 1976)

DAMAGE RESISTANCE WAS GOOD, ESPECIALLY FOR CONTACT WITH ITSELF OR WITH OTHER HARD MATERIALS. THE MATERIAL ALSO EXHIBITED LOW CORROSION RATES IN SODIUM.

209567 A78047471
THE DIFFUSIONAL GROWTH OF A GRAIN BOUNDARY CRACK
PULS, M.P.; DUTTON, R.
Issued by: ATOMIC ENERGY CANADA LTD., CHALK RIVER, ONTARIO; OCT. 1977
22 pp.
Report No.: AECL-5956
Treatment: THEORETICAL
Document Type: REPORT
Languages: ENGLISH
THE POSSIBILITY OF HIGH TEMPERATURE RUPTURE OCCURRING BY A GRAIN BOUNDARY DIFFUSIONAL MECHANISM IS CONSIDERED. IT IS ASSUMED THAT A PRE-EXISTING, INTERGRANULAR CRACK GROWS BY LOSS OF ATOMS FROM THE CRACK TIP TO THE GRAIN BOUNDARY. RUPTURE OCCURS WHEN THE CRACK HAS GROWN TO A CRITICAL LENGTH. A THEORETICAL TREATMENT OF THE KINETICS OF CRACK GROWTH IS PRESENTED AND EQUATIONS ARE DERIVED FOR THE CRACK VELOCITY AND TIME TO RUPTURE. A COMPARISON IS MADE WITH A PREVIOUS THEORETICAL MODEL DEVELOPED BY CHARLES (1976), TOGETHER WITH RUPTURE DATA OBTAINED EXPERIMENTALLY FOR THE NICKEL-BASED ALLOY, NIMONIC 80A. THE AUTHORS CONCLUDE THAT EXPERIMENTAL VERIFICATION OF THE THEORETICAL MODELS REQUIRES A COMPARISON WITH CRACK VELOCITY DATA RATHER THAN TIME TO RUPTURE DATA.

187794 A78035584
OXIDATION BEHAVIOUR OF FECRALLOY AND 20/25/NB STAINLESS STEELS AND A NICKEL-BASED ALLOY, PE16, IN ARGON CONTAINING 7 MUATM WATER VAPOUR AND 375 MUATM HYDROGEN
BENNETT, M.J.; HOULTON, M.R.
MATERIALS DEV. DIV., AERE, HARWELL, ENGLAND
J. NUCL. MATER. (NETHERLANDS) VOL.71, NO.2 333-44 JAN. 1978
CODEN: JNUMAM
Document Type: JOURNAL PAPER
Languages: ENGLISH
(6 Refs)
THE OXIDATION BEHAVIOUR OF FOUR ALLOYS (YTTRIUM-BEARING AND YTTRIUM-FREE FECRALLRY FERRITIC STAINLESS STEELS, A 20/25/NB AUSTENITIC STAINLESS STEEL AND A NIMONIC ALLOY, PE16) HAVE BEEN STUDIED IN ARGON (1.3 ATM PRESSURE) CONTAINING 7 MUATM WATER VAPOUR AND 375 MUATM HYDROGEN. THE ALLOYS WERE EXPOSED FOR PERIODS UP TO 7166 H AT TEMPERATURES IN THE RANGE, 650-1000 DEGREESC. THE OVERALL REACTION KINETICS WERE DETERMINED, AS WERE THE MAGNITUDES AND NATURE OF BOTH THE GENERAL AND ANY INTERNAL ATTACK. THE BEHAVIOUR OF THE ALLOYS IN WET ARGON WAS CONSISTENT WITH THAT OBSERVED IN FULLY OXIDISING ENVIRONMENTS, EXCEPT AT THE HIGHEST TEMPERATURE STUDIED, 800 AND 1000 DEGREESC, WITH THE 20/25/NB AND FECRALLOY STEELS RESPECTIVELY. IN CARBON DIOXIDE A GREATER ATTACK OF BOTH ALLOYS AND A MORE COMPLEX COMPOSITION OF THE OXIDE FILM ON THE 20/25/NB STEELS HAVE BEEN ATTRIBUTED TO ITS HIGHER OXYGEN POTENTIAL COMPARED WITH THAT OF THE H/SUB 2/O/H/SUB 2/ GAS MIXTURE.

024053 A77016198
A NEW INTERPRETATION FOR NUCLEAR MAGNETIC RELAXATION DATA OF A NICKEL-BASED ALLOY
CHORNIK, B.; KIWI, M.; ZUCKERMANN, M.J.
DEPARTAMENTO DE FISICA, FACULTAD DE CIENCIAS, UNIV. CENTRAL DE VENEZUELA, CARACAS, VENEZUELA
J. PHYS. F (GB) VOL.6, NO.12 2419-24 DEC. 1976
CODEN: JPFMAT
Treatment: THEORETICAL
Document Type: JOURNAL PAPER
Languages: ENGLISH
(16 Refs)
A REINTERPRETATION OF NUCLEAR RELAXATION DATA ON A DILUTE FERROMAGNETIC NI/SUB 0.98/PD/SUB 0.02/ ALLOY IS MADE IN THE LIGHT OF MULTIPLE SCATTERING THEORY AND THE COHERENT POTENTIAL APPROXIMATION. THE RESULTANT VALUE OF THE MAGNETIC MOMENT ON THE PD SITE IS HIGHER THAN PREVIOUS ESTIMATES USING RIGID BAND THEORY.

DIALOG File 13: INSPEC - 77-86/ISS18 (COPR. IEE 1986) See File 12(1969 thru 1976)

1609781 A86026992

Compression studies of a nickel-based superalloy, MAR-M200, and of Ni/sub 3/Al

Mauer, F.A.; Munro, R.G.; Piermarini, G.J.; Block, S.; Dandekar, D.P.

Center for Mater. Sci., NBS, Gaithersburg, MD, USA

J. Appl. Phys. (USA) vol.58, no.10 3727-30 15 Nov. 1985

CODEN: JAPIAU ISSN: 0021-8979

Treatment: EXPERIMENTAL

Document Type: JOURNAL PAPER

Languages: ENGLISH

(13 Refs)

The lattice parameter of a cubic nickel-based alloy, MAR-M200, has been determined as a function of pressure for 0<p<14 GPa at room temperature. A similar study was made for Ni/sub 3/Al in the range 0<p<11 GPa at room temperature. In both cases, the diamond anvil pressure cell was used in conjunction with the energy dispersive method of X-ray diffraction. The data were analyzed in the context of model equations of state and in comparison with other results from ultrasonic studies.

DIALOG File 13: INSPEC - 77-86/ISS18 (COPR. IEE 1986) See File 12(1969 thru 1976)

1609781 A86026992
Compression studies of a nickel-based superalloy, MAR-M200, and of Ni/sub 3/Al
Mauer, F.A.; Munro, R.G.; Piermarini, G.J.; Block, S.; Dandekar, D.P.
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J. Appl. Phys. (USA) vol.58, no.10 3727-30 15 Nov. 1985
CODEN: JAPIAU ISSN: 0021-8979
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: ENGLISH
(13 Refs)
The lattice parameter of a cubic nickel-based alloy, MAR-M200, has been determined as a function of pressure for O<p<14 GPa at room temperature. A similar study was made for Ni/sub 3/Al in the range O<p<11 GPa at room temperature. In both cases, the diamond anvil pressure cell was used in conjunction with the energy dispersive method of X-ray diffraction. The data were analyzed in the context of model equations of state and in comparison with other results from ultrasonic studies.

1068268 A83063266
STABILITY AND CRYSTALLIZATION OF AN AMORPHOUS NICKEL-BASED ALLOY
OZGOWICZ, W.; TYRLIK-HELD, J.; THOMAS, G.; ZAHRA, A.; LE COZE, J.
INST. DE METALL. PHYS. ET SOUDAGE, ECOLE POLYTECH. SILESIENNE, GLIWICE, POLAND;
SCR. METALL. (USA) VOL.17, NO.3 295-8 MARCH 1983
CODEN: SCRMBU ISSN: 0036-9748
U. S. Copyright Clearance Center Code: 0036-9748/83/030295-04$03.00/0
Treatment: EXPERIMENTAL
Document Type: JOURNAL PAPER
Languages: ENGLISH
(15 Refs)
RIBBONS OF THE AMORPHOUS NI-BASE ALLOY NI/SUB 82/CR/SUB 7/FE/SUB 3/SI/SUB 5/B/SUB 3/ WERE PRODUCED BY THE CHILL-BLOCK MELT SPINNING METHOD. DIFFERENTIAL SCANNING CALORIMETRY IN THE TEMPERATURE RANGE 20-600 DEGREESC AND X-RAY DIFFRACTION IN THE RANGE 20-800 DEGREESC WERE USED TO STUDY THE CRYSTALLISATION STAGES. STAGE I, 20 DEGREESC<T<450 DEGREESC, WAS SHORT RANGE ORDER REARRANGEMENT OF THE GLASS SOLUTION. STAGE II, T>450 DEGREESC, WAS CRYSTALLISATION OF THE SOLID SOLUTION ALPHA FROM THE GLASS BETA. THE GLASS TRANSITION (TG) OCCURS AT =450 DEGREESC. STAGE III, T=550 DEGREESC, WAS CRYSTALLISATION OF NI/SUB 2/B FROM BETA. STAGE IV, 550 DEGREES<T<800 DEGREESC, WAS THE APPEARANCE OF NEW, NOT WELL DEFINED, PHASES, NI/SUB 3/SI/SUB 2/, FE/SUB 4.5/NI/SUB 18.5/B/SUB 6/ AND FE/SUB 3/SIB.